

Establishing a comprehensive census of undergraduate economics curricula:

Foundational and special requirements for major programs in the U.S.

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Abstract

This study is the first of a series of studies, collectively embodying a multiphase mixed methods design. The overall objective of these studies is to explore and address a variety of issues and features of the discipline of economics, particularly as they relate to and represent past present and future factors of globalization, education, citizenship, and society. This is done by collecting and analyzing data on numerous aspects of the undergraduate economics curriculum, economics as a discipline, and economics as applied in the real world.

The overall purpose of these studies is to inform ongoing debates concerning the future of the discipline of economics and how it is taught, by examining and creating paradigms and methods that may be of aide. Additionally these studies collectively aim to outline, and in small ways develop, potential technological and organizational solutions for detailed longitudinal curriculum tracking. The frameworks employed and developed in these studies may eventually be scaled and adapted for all sorts of curricula. Ideally, the completion of this study's overall objective yields practical insights and tools that empower faculty and departments, in economics and eventually in general, to better understand and design their own curriculum.

This immediate study fills gaps in and updates data on the curriculum of undergraduate economics majors in U.S. institutions, while also establishing a baseline data set for future studies to build on. A qualitative census methodology is adapted and employed to explore how various institutional and program factors relate to certain types of major program requirements. Descriptive statistics are used for analysis, primarily to allow for comparisons to previous studies. In sum, the purpose of the data collected and analyzed in this census is to give a glimpse into the current state of the undergraduate economics curriculum in the U.S., and to inform the qualitative, quantitative, and transformative studies that are to follow in this multiphase series.

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Establishing a comprehensive census of undergraduate economics curricula:

Foundational and special requirements for major programs in the U.S.

The discipline and curricula of economics have faced consistent challenges and criticisms over the past century (Aerni & McGoldrick, 2002; Bartlett & Feiner, 1992; Bohan, 1937; Bonar, 1903; Brue, 1996; Cobb & Barker, 2001; Cook, 2005; Chomsky, 1987; “The economic curricula at Oxford and Cambridge”, 1921; Dalton, 1998; Davis, 1996; Davis, 2005; Edwards, MacEwan, & *the Staff of Social Sciences* 125, 1970; Fanon, 1961/2004; Ferguson, 1980; Fuess, 2001; Goodwin, 2001; Gould, 2001; Greenspan, 2008; Hammer & Soderqvist, 2001; Krueger, 2003; Moseley, Green, & Georges, 1991; Marshall, 1903; Naggar & Naggar, 2005; Newcomer, 1946; Rishi, 1998a; Rishi, 1998b; Ross, 1995; Seay, 1947; Siegfried, Bartlett, Hansen, Kelley, McCloskey, & Tietenberg, 1991a; Siegfried, Bartlett, Hansen, Kelley, McCloskey, & Tietenberg, 1991b; Siegfried & Wilkinson, 1982; Smith, 1776/2003; Slaughter, 1997; Stiglitz, 2007; Taylor, 1950; Tuttle, 1938; Wilber, 1986; Wolfe, 1913). Since the 2008 financial crisis, these challenges and criticisms have once again been brought to the forefront of economic debates (Acemoglu, 2013; Almeida, 2016; Caldwell, 2013; Ceulemans, De Prins, Cappuyns, & Coninck, 2011; Chang, 2014; Chester & Schroeder, 2015; Coit, 2015; Earle, Moran, & Ward-Perkins, 2017; Chomsky, 2016; Economy & Levi, 2014; Fairbrother, 2014; Ferguson, 2011; Green, 2013; Green, 2015; Grown, 2010; Henslin, 2011; Hodgson, 2011; Hoyt & McGoldrick, 2012; Ipate, Parvu, & Mitran, 2014; Johnson, Kwak, 2010; Keita, 2012; Kimakova, 2008; Lawson, 2012; Lopez, 2009; Marglin, 2011; McGoldrick, 2008; Moisi, 2010; Monbiot, 2017; Nembhard, 2008; Nesiba, 2012; Nye, 2011; Parvu, Ipate, & Mitran, 2014; Petkus, Perry, and Johnson, 2014; Poitras & Jovanovic, 2010; Reich, 2015; Rodrik, 2012; Rodrik 2018; Sandlin, Stearns, Maudlin,

& Burdick, 2011; Seaman & Nelson, 2011; Selca, Shaikh, Ghilarducci, Reddy, & Proano, 2012; Sheehan, Embery, & Morgan, 2015; Sloan, 2008; Stutter, 2009; Thornton, 2012; Thornton, 2013; Watts & Walstad, 2010). In broad strokes, these challenges and criticisms concern paradigms and assumptions of reality, human nature, knowledge, axiology, globalization, culture, economics, technology, power, civic rights and norms, and the individual. In terms of academic and professional development, both broadly and within economics, these issues revolve around what this author would summarize as three recurring thematic competencies.

The first two are intercultural and interdisciplinary competencies. The third this author deems “innerdisciplinary” competencies, meaning knowledge of the assumptions and paradigms of one’s own discipline, and the associated applications, implications, and limitations. Across all three desired competencies, economics curricula are in want of are comparisons of historical, philosophical, theoretical, methodological, and applied paradigms, real examples, and questions.

Of particular concern is that for over a century, in spite of desiring such competencies, the education of undergraduate economics majors and economists in the U.S. and much of the world, is of a narrow, decontextualized, superficial, hegemonic, even dogmatic, orthodoxy (Acemoglu, 2013; Almeida, 2016; Bartlett & Feiner, 1992; Brue, 1996; Caldwell, 1991; Caldwell, 2013; Chang, 2014; Earle et al., 2017; Edwards et al., 1970; Ferguson, 1980; Goodwin, 2001; Goodwin, 2018; Keita, 2012; Krueger, 2003; Lawson, 2012; Marglin, 2011; Moseley et al., 1999; Nembhard, 2008; Nesiba, 2012; Poitras & Jovanovic, 2010; Rishi, 1991a; Rishi, 1991b; Ross, 1995; Selca et al., 2012; Sheehan et al., 2015; Thornton, 2012; Thornton, 2013; Wilber, 1986). Current foundations of economics offer great tools to start with, but can be limiting unless students are taught what else there is within and outside of their discipline, and how to use this knowledge (Acemoglu, 2013; Almeida, 2016; Bartlett & Feiner, 1992; Brue,

1996; Caldwell, 1991; Caldwell, 2013; Davis, 1996; Earle et al., 2017; Edwards et al., 1970; Ferguson, 1980; Ferguson, 2011; Siegfried, 2012; Siegfried et al., 1991a; Siegfried et al., 1991b). Arguably, as a whole these are symptomatic of broader cultures, paradigms, and dynamics of education, civics, science, and policy, particularly in the context of the predominant, as of late neoliberal, paradigms and realities of industrialization and globalization over the last 150 years (Anyon, 1980; Au, 2011; Beltramo & Duncheon, 2013; Bodely, 2005; Canestrari & Marlow, 2013; Chang, 2014; Chomsky, 1986; Chomsky, 2016; Crotty, 1998; Dalton, 1998; Darder, Baltodano, Torres, 2009; Dillon, 2009; Dunne, Kurki, & Smith, 2013; Earle et al., 2017; Economy & Levi, 2014; Fanon, 1961/2004; Feinberg, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Garland-Thompson, 2009; Gould & Lewis, 2009; Greene & Elffers, 2000; Greenspan, 2008; Hammersley, 2012; Herman & Chomsky, 2002; Henslin, 2011; Hoyt & McGoldrick, 2012; Jacobs, 2010; Johnson & Kwak, 2010; Kincheloe, 1999; Lester, 2005; Marshall, 1903; Moisi, 2010; Monbiot, 2017; Neuman, 2011; Noddings, 2003; Nussbaum, 2007; Nye, 2011; Phillips & Burbules, 2000; Ponterotto, 2005; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sample, 2012; Sawyer, 2012; Slaughter, 1997; Sloan, 2008; Sleeter, 2005; Stiglitz, 2007; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015; Subedi, 2013; Sutter, 2009; Yates, 2009; Yorke & Knight, 2006).

Tellingly, since 2008, several organizations have formed with the aim of identifying, discussing, publicizing, and addressing the challenges and criticisms the discipline of economics faces, setting the tone for the 21st century. The most notable to this author are The University of Manchester Post-Crash Economics Society (2012), Rethinking Economics (2013), the International Student Initiative for Pluralism in Economics (2014), The Institute for New Economic Thinking (2015), Evonomics (2015), The Heterodox Academy (2015), and the New

Economy Coalition (2018). There are also at least four other organizations this author is aware of that have been addressing these challenges and criticisms since well before the 2008 financial crisis.

Collaborating since the 2008 financial crisis, the Schumacher Center for a New Economics (2018), established in 1980, and the New Economics Foundation (2018), established in 1986, established the New Economy Coalition (2018) in 2012. The Santa Fe Institute (2016), established in 1984, is notable for its early focus on complexity sciences, with co-founder Arthur (2018) directing work on what would become known as complexity economics. Finally, established in 1992, The Global Development and Environmental Institute at Tufts University (2018) has also focused on a variety challenges and issues of economics and economy under the direction of co-founder and economist Goodwin (2018).

There are some active attempts to gather data on education in economics, including within the aforementioned organizations. However, there appear to be no systems in place that collect, analyze, and utilize data concerning the past, current, and possible states of economic thought and education. Similarly, no systems comprehensively track and explore the relationship between economics curricula, institutions, faculty, students, alumni, and society.

A well designed system could have profound implications for efforts to rethink the economics curricula and discipline. Ideally such a system empowers students, professors, and institutions to better explore, learn, teach, research, and design economics as a discipline and curricula. Such a system could then easily be modified for use in and across other disciplines. Further, hopefully addressing the challenges, misunderstandings, complexities, contradictions, and even outright deceptions of U.S. education, policy, and economic thought, can U.S. and

global societies peacefully navigate and optimize the wants and needs of human beings (Acemoglu, 2013; Almeida, 2016; Canestrari & Marlow, 2013; Chomsky, 1986; Chomsky, 2016; Darder et al., 2009; Dillon, 2009; Earle et al., 2017; Economy & Levi, 2014; Edwards et al., 1970; Dalton, 1998; Dunne et al., 2013; Flinders & Thornton, 2013; Freire, 1970/2000; Garland-Thompson, 2009; Gould & Lewis, 2009; Greenspan, 2008; Hoyt & McGoldrick, 2012; Henslin, 2011; Ipate et al., 2014; Herman & Chomsky, 2002; Johnson & Kwak, 2010; Kruger, 2003; Moisi, 2010; Monbiot, 2017; Nye, 2011; Ritzer & Stepinisky, 2014; Stiglitz, 2007; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015; Sutter, 2009).

As the first study (Study 1a) in the first phase (Phase One) of an overarching multiphase mixed method design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008), the purpose of this study is to introduce the intended body of studies and begin establishing a baseline data set. The overall objective of these studies is to explore and inform challenges and issues that the discipline of economics, the education system, and the forces of globalization all share. In the process, technological solutions, conceptual frameworks, and methods that address these challenges and issues are proposed, developed, refined, and imagined. For clarity, this overall objective serves three concrete purposes.

The first purpose of these studies is to explore and inform ongoing debates concerning the present and future states of predominant ideals and practices in economic discourse, research, policy, and education. The second purpose of these studies is to explore how the past, present, and future of ideal and practiced paradigms of research, discourse, policy, and pedagogy in economics and education are manifest in the complexities and challenges of the 21st century. Finally, these studies develop and explore technological and organizational solutions aimed at

empowering students, faculty, and institutions, in economics and in general, to better understand, design, and improve curricula.

Pursuing this overall objective, three phases are proposed. This particular study is the first of several, primarily qualitative, studies that will collect, explore, and describe a variety of data concerning undergraduate economics major programs in the U.S. As a whole, Phase One will primarily collect data on the curricula, institutions, programs, students, faculty, and alumni associated with economics and economic education at an undergraduate level in the United States.

Phase One primarily employs descriptive statistics and analysis, and establishes the initial framework necessary to inform both current debates and intended future phases of study. Studies in Phase Two will take the frameworks, data, and findings of Phase One, critically explore them along with new variables, and develop a mixed methods instrument (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) for refined assessment of economics curricula. Phase Three primarily will employ action research (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601) as a means of transforming economics and economic education, generally building on the first two phases.

Several questions can be understood as guiding these studies' overall multiphase mixed methods design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). What is the current state of economics and economic education in terms of ideals, practices, challenges, and issues? How did it come to be so? What could be improved or changed, why, how, and to what end? How do the factors of such questions and answers impact

our lives individually and globally? The overall multiphase mixed methods design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) will be briefly expanded upon in the methodology section.

Beginning with this study, Study 1a, Phase One updates and expands upon past studies of undergraduate economics curricula. Like Petkus et al. (2014), Phase One and this study ask, “[t]o what extent does practice conform to principle” (p. 56). Specifically, to what extent are the generally accepted ideal standards of undergraduate economics curricula put into practice? The present ideals were established primarily by Siegfried et al. (1991a; 1991b), and reaffirmed by Siegfried (2012) and Petkus et al. (2014). Petkus et al. (2014) focus on the economic core courses; courses Siegfried et al. (1991a, p. 21-23; 1991b, p. 202-205) categorize as either, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics).

Siegfried et al. (1991a; 1991b) also describe three other categories of ideal requirements for an undergraduate economics major that Petkus et al. (2014) never mention; a curious omission in a study attempting to explore the, “extent to which practice conforms to principle” (p. 56). For that matter, some of the gravest challenges faced by economics can only be assessed and addressed by them (Siegfried et al., 1991a; 1991b; Earle et al., 2017; Sutter, 2009). The last ideal requirement category, “capstone experience” (Siegfried et al., 1991a, p. 24), is incidentally included in this study, as it falls under Siegfried and Wilkinson’s (1982) “special requirements” (p. 131-132). The other studies to follow in Phase One will primarily gather data on the other two ideal course requirement categories established by Siegfried et al. (1991a; 1991b) and omitted by Petkus et al. (2014): Breadth and Depth.

Breadth and Depth are primarily fulfilled by the electives offered and required by the economics major program, and the courses required by economics major programs that do not fall into the Foundations categories and aren't necessarily even economics courses themselves. Siegfried et al. (1991a, p. 23) state that, even if present, both ideal requirement categories are typically deficient in practice. As Siegfried et al. (1991a) explains, "[b]readth is typically achieved by students self-selecting elective courses to explore subfields and topics within economics, which draw upon the foundations courses, and are often enriched by historical, institutional, and empirical detail" (p. 23). Students may take, "[a]s few as three, and as many as six or seven courses ... and the choice is usually unconstrained" (Siegfried et al., 1991a, p. 23).

However, "[t]his format all too often results in students acquiring a narrow, parochial perspective, unable to come to grips with deviations from marginalist thinking" (Siegfried et al., 1991a, p. 23). Further, students are often, "incapable of dealing sensibly with problems that involve approaches different from atomistic models of individual choice" (Siegfried et al., 1991a, p. 23). Something that is particularly problematic as, "atomistic models of individual choice" (Siegfried et al., 1991a, p. 23), are both central to economics and part of why economics is facing so many challenges today, as such models have been severely criticized in the sciences (Arthur, 2018; Chang, 2014; Earle et al., 2017; Evonomics, 2015; Goodwin, 2001; Goodwin, 2018; Hammersely, 2012; Institute for New Economic Thinking, 2015; Lawson, 2012; Neuman, 2011; Phillips & Burbules, 2000; Ponterotto, 2005)

To remedy this, Siegfried et al. (1991a) recommends that economics major programs, "[r]equire at least four or five elective courses", and, "structure student choices to produce greater breadth" (p. 23). Specifically, Siegfried et al. (1991a), "recommend at least one course

each in 1) contextual, 2) international, and 3) public sector economics” (p. 23). The contextual requirement merits detail. Siegfried et al. (1991a) state that:

Contextual inquiry includes courses in economic history (where connections between economics and history are explicit), history of economic thought (where different modes of thought are exposed), comparative economic systems (where social/political/cultural dimensions that influence distinctive economic systems are compared), and area studies (where synthetic analyses of countries and regions are explored). (p. 23)

These and similar courses, “take the edge off narrow thinking about economics, and they illuminate the importance of context and structure (initial conditions and constraints) that shape the dominant ‘marginalist’ orientation of economics” (Siegfried et al., 1991a, p. 23).

The “international” courses, such as, “trade and finance ... economic development, [and] comparative systems”, ideally, “expand the students’ perspective from the parochial to the global” (Siegfried et al., 1991a, p. 23). Such international courses are hopefully, “placing them in a stronger a stronger position to use their tools of economic inquiry in a world that is rapidly becoming more integrated” (Siegfried et al., 1991a, p. 23). The “public sector economics” courses ideally help students understand the theoretical and applied aspects of the relationships between the individual, the free market, and government or similar collective forces (Siegfried et al., 1991a, p. 23).

Depth is achieved, “in elective courses ... by going beyond the coverage of textbook-oriented field courses to how current knowledge evolved and how new knowledge is developed in the field” (Siegfried et al. 1991a, p. 23). However, here there is also much to be desired.

Siegfried et al. (1991a) explain that, “[w]hile students often leave elective courses with sound ‘state of the art’ surveys of coverage, they often lack a feeling for the field’s central research issues” (p. 23). Additionally students do not adequately understand, “how knowledge about them has developed over time, and how the ideas revealed in the course are related to the fundamental theories of economics” (Siegfried et al., 1991a, p. 23). In spirit, Siegfried et al. (1991a) recommended improvements in the area of Depth are essentially the same as the recommendations for Breadth.

Data on Breadth and Depth requirements and offerings of undergraduate economics major programs will be collected in the next Phase One study, Study 1b. Data on requirements and offerings outside of each economic major program, such as institutional or departmental requirements and offerings, will be gathered in Phase One, Study 1c. Study 1c will be novel in research on undergraduate economics curricula in the U.S., whereas Study 1b will largely be a revamp of dimensions examined by Siegfried and Wilkinson (1982).

When combined with the previous studies of Phase One, Study 1c will lend unprecedented context and detail to the understanding of the requirements and offerings economics majors have in U.S. institutions. Study 1c will also be key in controlling for sources of confounding variables in past studies of economic major program requirements and offerings (Petkus et al., 2014; Siegfried & Wilkinson, 1982). As described and generally controlled for in the methodology and methods, Foundations and electives alike are often required or offered by sources outside the economic major program. Sometimes they are found as general education or other requirements and offerings of a department, school/college, or institution, and are often listed alongside the economic major program requirements and offerings, even as pre-requisites.

How comprehensively and strictly the definitions and protocols are designed, applied, and interpreted can lead to variance in what studies report as being required or offered by an economics major program. As designed, the definitions, protocols, and methods used to collect data in Phase One will help to ensure that course requirements and offerings are accurately and reliably attributed to their source, but can still be analyzed for their presence. This allows for greater strength and flexibility in assessing and building upon data concerning present and alternative ideals and practices of economic education, the primary objective of Phase Two.

As can be seen, judging the degree to which ideals are practiced, let alone how they are practiced and what impacts they might have, requires data on many other aspects of economics curricula; thus the necessity of the multiphase mixed methods research design (Creswell, 2012; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). For the sake of feasibility, this study focuses primarily on the same variables (economic core requirements, institution type, and institution rank) as Petkus et al. (2014; see Table 1). Additionally, data based on select variables (the Special requirements) from Siegfried and Wilkinson's (1982, p. 131-132) study of undergraduate economics curricula are also collected and analyzed. A modified version of the census methodology introduced by Petkus et al. (2014) is created and employed in this study, establishing a framework to be developed further in future phases. In keeping with previous studies, descriptive statistics are used for analysis of the data, both as collected and as compared to previous studies.

In this context, this immediate study is concerned with three orders of questions. The primary questions seek to answer, to what extent are the Foundations courses from Siegfried et al.'s (1991a; 1991b) ideal economic core requirements for undergraduate economics majors, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II

(Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics), minimally required by undergraduate economics major programs in the U.S.? The secondary questions examine, to what extent are the courses that Siegfried and Wilkinson (1982) call, “special requirements for the economics major” (p. 131-132), required by undergraduate economics major programs in the U.S.? Tertiary questions concern what amounts to a number of miscellaneous variables that were incidentally recorded and may be convenient to report on in this study if time permits.

Each of these broad questions has numerous operationalized sub questions and accompanying hypotheses. These operationalized sub questions and hypotheses will be handled in the methods. That being said, this study has three general hypotheses.

First, compared to Petkus et al.’s (2014) analysis of data from 2010 on the U.S. undergraduate economics curriculum, it is hypothesized that all institution types will have increased the degree to which they require Foundations courses. Second, it is hypothesized that Petkus et al.’s (2014) findings, that average course requirements of major programs within the Top 50 institutions of a given type will differ from those of the Remaining institutions, will hold. Third, regarding Siegfried and Wilkinson’s (1982) Special requirements (p. 131-132), it is hypothesized that the percent of institutions requiring special requirements will have generally increased, with some special requirements being found to have increased more than others.

In sum, existing data sets concerning the composition of the undergraduate economics curriculum are either outdated, feature validity threats, or are narrow or incomplete in their attempts to assess the composition and features of the undergraduate economics curriculum (Bosshardt, Watts, & Becker, 2013; Brue, 1996; Dean & Dolan, 2012; Petkus et al., 2014; Scott

& Siegfried, 1999; Siegfried, 2000; Siegfried et al, 1991a; Siegfried et al., 1991b; Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982; Sweeney, Siegfried, Raymond, & Wilkinson, 1983). In particular, they often fail to address or adequately reveal the extent to which, “practice conform[s] to principle” (Petkus et al., 2014, p. 56). Criticizing previous studies for relying on small or non-representative samples, Petkus et al. (2014) explain that their census approach and inclusion of rank reveal nuances previously hidden. Thus, in the absence of truly comprehensive studies, the qualities and trends of the undergraduate economics curriculum are difficult to ascertain.

The purpose of this qualitative study is to conduct a census on the curriculum for population of undergraduate economics major programs in the U.S., primarily based on the research designs of Petkus et al. (2014) and Siegfried and Wilkinson (1982). Descriptive statistics are used to provide a cursory analysis and summary of the data, both as collected and as compared to Petkus et al. (2014) and Siegfried and Wilkinson (1982). The data collected and analyzed in this study will update and fill gaps in data concerning the composition of undergraduate economics curriculum, and thus aims to inform ongoing debates concerning the form and function of its principles and execution. Data collected in this study also lays the foundation for intended follow up studies exploring and informing the challenges and solutions education, economics, and society, share in the 21st century.

Knowledge Capital and Curricula

Central to the overall objective of this multiphase mixed methods design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) is the fact that fundamentally underlying any of the above forms and functions of economics are both formal

and informal education. The only way to ensure an economy's continuous unlimited growth is to invest in and improve knowledge capital (Greenspan, 2008; Mankiw, 2013; Whaples, 2007).

Capital is either physical (raw materials and physical means of production), financial (i.e. cash and financial assets that can generate income), or human (labor, knowledge, political, cultural, and social) (Black, Hashimzade, & Myles, 2013; Bodley, 2005; Bourdieu, 1986; Greenspan, 2008; Mankiw, 2013; Nee, 1990; Nee & Oppen, 2010; Sanders & Nee, 1996; Whaples, 2007).

Across disciplines, the specifics concerning the types and meanings of forms of capital, particularly human capital, are blurrier than just described (Black et al., 2013; Bodley, 2005; Bourdieu, 1986; Greenspan, 2008; Mankiw, 2013; Nee, 1990; Nee & Oppen, 2010; Sanders & Nee, 1996; Whaples, 2007). If broadly interpreted through its formal and informal forms and interactions, knowledge capital may be thought of as the origin of, or capital of, capital. As such knowledge capital may be thought of as what unites all forms of capital and creates and embodies most, if not all, of the economy; knowledge capital may be thought of as the means of having, shaping, pursuing, producing, and achieving human all wants and needs (Black et al., 2013; Bodley, 2005; Bourdieu, 1986; Greenspan, 2008; Jacobs, 2010; Mankiw, 2013; Nee, 1990; Nee & Oppen, 2010; Noddings, 2003; Nussbaum, 2007; Marshall, 1903; Sanders & Nee, 1996; Whaples, 2007).

The primary way we invest in knowledge capital, as a society and as individuals, is arguably through institutions, programs, and other sources of formal and informal information or experiences (Anyon, 1980; Au, 2011; Beltramo & Duncheon, 2013; Black et al., 2013; Bodley, 2005; Canestrari & Marlowe, 2013; Darder et al., 2009; Dillon, 2009; Feinberg, 1999; Flinders & Thornton, 2013; Greenspan, 2008; Henslin, 2011; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Mankiw, 2013; Noddings, 2003; Nussbaum, 2004; Ravitch, 2003; Ritzer &

Scott, 2014; Stepinisky, 2014; Sleeter, 2005; Sawyer, 2012; Whaples, 2007). Central to Phase Two, such things are can be understood as and through “the questions of curriculum”, as Dillon (2009) deftly synthesizes from the years of debate and understandings in the field of curriculum studies (Figure 1). In this sense, curricula are one of the primary ways we maintain, improve, and expand knowledge capital, and thus the economy (the dynamic forces of beliefs/cognition behaviors and materials interacting in a given system) (Anyon, 1980; Au, 2011; Beltramo & Duncheon, 2013; Black et al., 2013; Bodely, 2005; Canestrari & Marlowe, 2013; Darder et al., 2009; Dillon, 2009; Dolton, & Vignoles, 2002; Feinberg, 1999; Flinders & Thornton, 2013; Greenspan, 2008; Henslin, 2011; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Mankiw, 2013; Noddings, 2003; Nussbaum, 2004; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sleeter, 2005; Sawyer, 2012; Whaples, 2007).

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|---|
| <ol style="list-style-type: none"> 1. Nature of curriculum—<i>What is it?</i> <ol style="list-style-type: none"> a. Essence or substance—<i>What, at bottom, is it?</i> b. Properties or character—<i>What is it like?</i> 2. Elements of curriculum—<i>What are the things that compose it?</i> <ol style="list-style-type: none"> a. Teacher—<i>Who?</i> b. Student—<i>Whome [sic]?</i> c. Subject—<i>What?</i> d. Milieu—<i>Where and when?</i> e. Aim—<i>Why? To what end?</i> f. Activity—<i>How?</i> g. Result—<i>What comes of it? Who learns what?</i> 3. Practice of curriculum—<i>How to think and act it?</i> <ol style="list-style-type: none"> a. Action—<i>What to do?</i> b. Thought—<i>How to think?</i> |
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Figure 1. Adapted from Dillon’s (2009) “The questions of curriculum”. Permissions Pending.

It is knowledge capital that is supposed to allow us to escape Malthusian economics and allow for growth and opportunity for everyone (Bodley, 2005; Greenspan, 2008; Mankiw, 2013; Whaples, 2007). Overall, these studies are concerned that the formal and informal systems

creating and embodying knowledge capital in a given society can be subject to severe structural, if not (effectively) Malthusian, limits. These are limits in the ability to resolve dissonance, contradictions, and inefficiencies of mind, matter, and systems – limits in the ability to sustainably improve the quantity and quality of provisions for humanity's needs and wants – limits in the ability to truly maximize individual and aggregate potential for human development and fulfilment – limits in the ability to imagine, consider, discuss, choose, improve, expand, produce, consume, to be free to be in being. While there is likely some ultimate limit to human development of knowledge capital, there are many, primarily structural, inefficiencies in education, production, and the general pursuit of fulfillment as humans.

Curricula, particularly the formal curricula of educational institutions and systems, are the most influential and accessible factors in the production of knowledge capital. In fact, mass education in the U.S. has historically occurred with two objectives; the creation and molding of a labor-consumer class, and of a complimentary system of national consciousness/identity/values (Anyon, 1980; Au, 2011; Bodley, 2005; Darder et al., 2009; DuBois, 1903; Feinberg, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Marshall, 1903; Noddings, 2003; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014). Historically mass education has been a key contributor to the economic success of the U.S. However, from kindergarten through university, U.S. education systems have long stagnated, with policy lagging behind research concerning education development and fulfilment (Anyon, 1980; Au, 2011; Bodley, 2005; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky; 2016; Darder et al., 2009; Dunne et al., 2013; Feinber, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999;

Noddings, 2003; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sleeter, 2005; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015).

This is not entirely accidental, as education is typically actively and passively structured in such a way that previous societal structures and dynamics are maintained and reinforced, serving or protecting the interests of those with influence, intentionally and unintentionally. In other words, part of why our education system is riddled with inefficiencies and outright problems is because their structures were often at best only intended to elevate the masses so far, in an era long past at that (Anyon, 1980; Au, 2011; Bodley, 2005; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Dunne et al., 2013; Feinberg, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sandlin et al., 2011; Seay, 1947; Sleeter, 2005; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015). In this sense, democratic values and norms are almost never of the United States' primary goals or interests, and, further, they have been consistently shaped, manufactured, limited or subverted in the interests of power and the status quo throughout U.S. history (Anyon, 1980; Au, 2011; Bodley, 2005; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Dunne et al., 2013; Feinber, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sleeter, 2005; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015).

In this context, curricula, as designed and implemented, are often at best hindered by outdated and inefficient knowledge or practices, if only on the side of the policy makers (Anyon, 1980; Au, 2011; Bodley, 2005; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Dunne et al., 2013; Feinber, 1999; Flinders & Thornton, 2013; Freire,

1970/2000; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sleeter, 2005; Subedi, 2013; Stitzlein, 2012; Stitzlein, 2014; Stitzlein, 2015). In general and higher education, and indeed economic education, curricula seem more a product of forces of culture, power, and economics, rather than a product of ideals in education or economics as disciplines of thought, research, practice, and policy (Anyon, 1980; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Flinders & Thornton, 2013; Freire, 1970/2000; Sawyer, 2012; Stitzlein, 2012; Stitzlein 2014, Stitzlein 2015). Training and staffing enough adept teachers, researchers, administrators, and policy makers is challenging when the quality and impact of one's curriculum on human and economic development varies so wildly (Acemoglu, 2013; Anyon, 1980; Canestrari & Marlowe, 2013; Darder et al., 2009; Flinders & Thornton, 2013; Freire, 1970/2000; Sawyer, 2012; Sutter, 2009). This is even more difficult when very few are fully versed, prepared, or supported to face the challenges of the 21st century, let alone the 20th, as histories' inefficiencies compound (Acemoglu, 2013; Anyon, 1980; Au, 2011; Canestrari & Marlowe, 2013; Darder et al., 2009; Flinders & Thornton, 2013; Freire, 1970/2000; Sawyer, 2012; Sutter, 2009; Stitzlein, 2012; Stitzlein 2014, Stitzlein 2015).

In short, education in the U.S. has been so overwhelmed by the issue of overcoming the relics of the 19th century and the challenges of the 20th that it would seem ill prepared for the lightning pace of the 21st century challenges to come (Anyon, 1980; Au, 2011; Bodley, 2005; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Dunne et al., 2013; Feinberg, 1999; Flinders & Thornton, 2013; Freire, 1970/2000; Greenspan, 2008; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Noddings, 2003; Nussbaum, 2007; Ravitch, 2003; Ritzer & Stepinisky, 2014; Scott, 2014; Sleeter, 2005; Stitzlein, 2012; Stitzlein 2014,

Stitzlein 2015; Yates, 2009). While formal aspects of curriculum vary, sometimes wildly, in context, intent, content, execution, and outcomes, they nonetheless give valuable insight into the systems producing knowledge capital in the U.S. By coming to thoroughly understand the systems composing curriculum, we may begin to improve our educational systems, civic society, and quality of life (Anyon, 1980; Canestrari & Marlowe, 2013; Chomsky, 1987; Chomsky, 2016; Darder et al., 2009; Dunne et al., 2013; Flinders & Thornton, 2013; Freire, 1970/2000; Greenspan, 2008; Jacobs, 201; Johnes, 2005; Mankiw, 2013; Ritzer & Stepinisky, 2014; Stitzlein, 2012; Watts & Walstad, 2010; Yates, 2009; Yorke & Knight, 2006).

Economics and the economy are composed of and occupied with the dynamics between mind and matter. In researching and rectifying the challenges and inefficiencies in the systems creating our economies curricula, and lives alike, we may ultimately ensure the continued growth of knowledge capital, and thus the economy and human potential (Anyon, 1980; Au, 2011; Beltramo & Duncheon, 2013; Black et al., 2013; Bodely, 2005; Canestrari & Marlowe, 2013; Darder et al., 2009; Dillon, 2009; Feinberg, 1999; Flinders & Thornton, 2013; Greenspan, 2008; Henslin, 2011; Herman & Chomsky, 2002; Jacobs, 2010; Kincheloe, 1999; Mankiw, 2013; Nee, 1990; Nee & Oppen, 2010; Noddings, 2003; Nussbaum, 2004; Ravitch, 2003; Ritzer & Stepinisky, 2014; Sleeter, 2005; Sanders & Nee, 1996; Sawyer, 2012; Whaples, 2007; Yates, 2009; Yorke & Knight, 2006). Thus, in this context the undergraduate economics curriculum would seem an ideal study subject; modelling how one can scale transformative studies of curriculum, while helping economics, education, the economy, and society overcome structural limits and inefficiencies.

Previous Studies of the Economics Curriculum

Petkus et al. (2014) state that Siegfried et al. (1991a), Siegfried et al. (1991b), as confirmed by Siegfried (2012), have established, in principle, the most accepted ideals and standards for economics curricula in the United States. It is in the context of, “this broad consensus on the [economics] curriculum”, that Petkus et al. (2014) state, “the question remains: [t]o what extent does practice conform to principle?” (p. 56). Petkus et al. (2014) is one of the few to address this question, particularly in recent years. Further, Petkus et al. (2014) offer most the comprehensive and recent methodology and data set concerning the composition and trends of the economic core requirements in undergraduate economics curriculum in the U.S.

Petkus et al. (2014) focus on the economic core course requirements as a function of institution type and rank. These are courses Siegfried et al. (1991a, p. 21-23; 1991b, p. 202-205) categorize as either, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics). However, Siegfried et al.’s (1991a; 1991b) established ideals of economics curricula also include Breadth and depth; standards not addressed by Petkus et al. (2014). Petkus et al.’s (2014) methodology was excellent for its intents and purposes of gathering data on the Foundation courses, but they leave much of their initial guiding research question and purpose unaddressed and unanswered. In this sense, this study seeks to update and add to Petkus et al.’s (2014) and Siegfried and Wilkinson’s (1982) methodology and findings, while setting the stage for increasingly comprehensive future studies.

Petkus et al.’s (2014) literature review found that all previous studies of the composition of undergraduate economics curricula requirements in the U.S. were, “based on samples of

institutions” (p. 57). Petkus et al. (2014) suspected that sampling obscures key nuances in the population. For this reason they created and took a census of what they deem the, “population” (p. 57), of undergraduate economics major programs (in U.S. institutions listed in the *U.S. News and World Report* colleges and rankings), and their *economic core* (Foundations) requirements. Specifically, Petkus et al. (2014), “recorded only required economics, calculus, and statistics courses, *not required courses in other disciplines* [emphasis added]”, (p. 58).

Petkus et al. (2014) only reference Siegfried and Wilkinson (1982) as previously examining what this author calls “non-economics core requirements” and “elective requirements” of the economics major, in addition to the economic core requirements. In other words, Siegfried and Wilkinson (1982) collected data on *all* course requirements and electives of economics major programs, regardless of their disciplinary origin. As will be discussed, Petkus et al.’s (2014) definition is not as straight forward as it seems.

In this study’s extensive literature review, Siegfried and Wilkinson’s (1982) study appears to be the most comprehensive investigation of the economics curriculum’s composition in terms of the variety of data collected. For this reason, Siegfried and Wilkinson’s (1982) study is an indispensable model and data source for studies concerning the economics curricula, with only Taylor (1950) (a committee report Taylor headed) rivaling it in comprehensiveness. However, Siegfried and Wilkinson’s (1982) study was performed before the internet and relied upon responses to surveys via mail and phone, and thus their data is sample based. Further, in spite of its thorough design and wide range of variables examined, Siegfried and Wilkinson’s (1982) study did not include institution rank, which has taken off in significance since the their study (Morse, 2009; Morse, 2016; Morse, Mason, & Brooks, 2017).

Beginning data collection in 2010, Petkus et al. (2014) looked through, “all 1,428 universities and colleges listed in the *2010 U.S. News & World Report* rankings”, published in 2009, “using school Web sites and official academic catalogs” (p. 57). In their initial data collection efforts Petkus et al. (2014) found that, “[f]orty-five percent of schools do not offer an economics majors” (p. 57). Additionally, “[o]f the 792 schools that do, many offer multiple versions of the economics major, each with different requirements” (Petkus et al., 2014, p. 57; see Table 1). The fact that multiple versions of the economics major exists within each institution, “is missed when data are aggregated at the degree or school level” (Petkus et al., 2014, p. 57).

For this reason Petkus et al. (2014), “classify each degree, track, or concentration with ‘economics’ in its title as its own ‘major program,’ for a total of 1,601 different programs” (p. 57). Petkus et al. (2014) excluded, “[p]re-professional programs (law, MBA, and so on) and majors in agricultural economics departments” (p. 61). Petkus et al. (2014) also sought to weed out programs, “deemed as offering business degrees with an economics concentration rather than an economics degree” (p. 61). All of Petkus et al.’s (2014) data is from economics major programs that granted bachelor’s degrees; no associates degrees, certificates, or minors. Petkus et al. (2014) report that, “[o]n average, schools offer two versions of the major, with 5 percent offering four or more” (p. 57). As will be addressed in the methods section when further defining and operationalizing the variables, and in the findings section, this definition is not as straight forward as it sounds and can cause a range of outcomes depending on how it is interpreted.

Petkus et al. (2014) found that their population data, captured by the full census of core requirements, “reveal important differences in curricular requirements across institution types and by rank” (p. 57). Institution type is a common means of organizing data on the economics

curriculum (Bosshardt et al., 2013; Brue, 1996; Dean & Dolan, 2012; Petkus et al., 2014; Scott & Siegfried, 1999; Siegfried, 2000; Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982; Sweeney et al., 1983). On the other hand, Petkus et al. (2014) claim and appear to be the only study to address rank.

Institution and rank are central to this immediate study and the studies to follow. However, as will be described, incorporating rank into analysis is challenging due to the design of the *U.S. News and World Report*; an issue the author found a way to overcome after this study's analysis was almost entirely completed. Additionally, built into future studies of Phase One and Phase Two will be collection and analysis of a variety of data from the several other higher education ranking systems. Phase Two in particular will critically explore curricula content and structure as they relate to rank, demographics, selectivity, tuition, support, social mobility, debt ratios, and short and long term employment outcomes of institutions and programs.

For these reasons, this study focuses primarily on the relationship between institution type and economic core requirements, with more comprehensive analysis of rank as it relates to economics curricula to occur at the end of Phase One and throughout Phase Two. Concerning rank, initially this study planned on only replicating Petkus et al.'s (2014, p. 58) rank analysis for direct comparison. However, after almost all of this study's findings were completed, the author managed to include the two institution types omitted from rank analysis by Petkus et al.'s (2014) due to the complicated rank structure for the two institution types; Regional Universities and Regional Colleges. As a result, this study is the first study to present an analysis of rank's relationship with economic core requirements of major programs in these two institution types.

Institution Type

Several classification frameworks for institution type have been used by past studies of the undergraduate economics curriculum. For this reason, certain study comparisons can pose some challenges. Siegfried and Wilkinson (1982) and Sweeney et al. (1983) use, and provide definitions for, “five of the Carnegie Code classifications developed by the Carnegie Commission on Higher Education (1973)” (Siegfried & Wilkinson, 1982, p. 126).

Both Siegfried (2000) and Scott and Siegfried (1999) use and present data from, “the American Economic Association’s Fall 1998 Universal Academic Questionnaire” (Siegfried, 2000, p. 202), using three classifications for institutions to organize their data. These three classifications appear to distinguish institutions by whether they at most grant a bachelor’s degree, master’s degree, or Ph.D. It is not clear if the three classifications used are based on the *Carnegie Classifications* (Indiana University Center for Postsecondary Research, n.d.), but it seems likely, and, if so, it is likely based on the 1994 edition of the *Carnegie Classifications* (Carnegie Foundation, 1994). Petkus et al.’s (2014) study uses, “the 2010 ... *U.S. News & World Report* institutional categories” (p. 57), National Universities, Masters, Liberal Arts, and Baccalaureates, which are in turned based on the 2005 edition of the *Carnegie Classifications* (Carnegie Foundation, 2006).

Begun in 1970 by the Carnegie Foundation for the Advancement of Teaching, the Carnegie Commission on Higher Education (1973) and its later incarnations have published seven updates of classifications; Carnegie Council on Policy Studies in Higher Education (1976), Carnegie Foundation for the Advancement of Teaching (1987; 1994; 2001; 2006; 2011; & 2016)

(The Carnegie Classification of Institutions of Higher Education, n.d.; Indiana University Center for Postsecondary Research, n.d.).

In 2015, “[t]he Carnegie Foundation for the Advancement of Teaching ... transferred responsibility for the Carnegie Classification of Institutions of Higher Education to Indiana University Bloomington’s Center for Postsecondary Research” (Carnegie Foundation, 2014). Whereas 2000 through 2015 featured updates every five years, beginning at the end of 2018 or early 2019 the classifications will be updated every three years, as, “the shorter cycle will better reflect the rapidly changing higher education landscape.

There are three available, if not existing, editions of methodology and definition guides for the *U.S. News and World Report* (Morse, 2009; Morse, 2016; Morse, Mason, Brooks, 2017). Chief data strategist Robert Morse (2009) states that the, “2010 edition of *America’s Best Colleges* uses the Carnegie Foundation for the Advancement of Teaching’s 2006 Basic [sic] version of its classifications”. Some digging confirms that this is indeed *The Carnegie Classification of Institutions of Higher Education*, 2005 edition, which was published in 2006 by the Carnegie Foundation for the Advancement of Teaching (The Carnegie Classification of Institutions of Higher Education, n.d.; Indiana University Center for Postsecondary Research, n.d.). Notably, the *U.S. News and World Report* classifications have since renamed two of their institution categories; Masters was renamed Regional Universities, and Baccalaureates was renamed Regional Colleges (Morse, 2009; Morse, 2016; Morse et al., 2017).

As mentioned before, these differences in institution classifications require that any comparison of studies should try to take this under consideration. Implicitly to account for this, Petkus et al. (2014) compares their data to previous studies in two general ways. Sometimes

Petkus et al. (2014) compare their percent of *all* institutions requiring a given required economic core course with other studies' percent of all institutions requiring that course. Other times, Petkus et al. (2014) compares their percent of *each* institution type requiring a given required economic core course with other studies' percent of all institutions requiring that course. This study will take a similar approach to analyzing and discussing data.

Petkus et al.'s (2014) results concerning economics major programs and their economic core requirements by institution type can be seen in Table 1, which will serve as a model for how this the bulk study's data is displayed. Before discussing their findings it is worth noting that Petkus et al. (2014) report on, "Principles of Economics", rather than on Intro to Microeconomics and Intro to Macroeconomics. Siegfried and Wilkinson (1982) similarly reports only on the presence of a requirement for an "introductory" course, rather than collecting data in the individual types on introductory courses required. Thus, in Table 1, Petkus et al.'s (2014), "Principles of Economics" (p. 57), *is an aggregate of* programs requiring *at least one semester* of a course concerned with Foundations I (Siegfried et al., 1991a; 1991b).

Specifically, "Principles of Economics" (Petkus et al., 2014, p. 57) presumably shows the percent of institutions that *require at least one semester of either* Intro to Microeconomics, Intro to Macroeconomics, *or* a course that addresses Intro to Microeconomics and Intro to Macroeconomics all at once. The last of these three courses this study defines and includes later as "All-in-One Intro Micro-Macro". Thus, whereas Petkus et al. (2014) does not report on the specifics of how the requirements of Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro are distributed by institution type, this study does.

Instead, Petkus et al. (2014) address Principles requirements in more detail in Table 2, which displays the percentages of whether or not programs at institutions required a one semester course, a two semester course, or “either” (p. 60). Table 2 also displays whether programs requiring *two semesters* of introductory economics courses required students take Intro to Microeconomics first, Intro to Macroeconomics first, or allow students to choose the sequence (Petkus et al., 2014, p. 58). This study does not gather data concerning the sequencing of introduction courses.

This is in part because Petkus et al. (2014) found that 64% to 78% of institutions that required both Intro to Macroeconomics and intro to micro economics did not specify a sequence, but also because the data did not seem terribly useful to report on. Also not collected is data on the, “[p]ercent of major programs allowing”, students to choose, “either”, one or two semesters of introductory economics courses (Petkus et al., p. 58; see Table 2), as the variable does not seem terribly meaningful as a construct or as data. Future studies of Phase One will round out such details.

This study, Study 1a, gathers data on Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro, reporting data on each individual course requirement and their aggregate as “Principles of Economics” (Petkus et al., 2014, p. 57) courses. Thus, it will be possible to compare this study’s data to Petkus et al.’s (2014) data on, “Principles of Economics” (p. 57), displayed in Table 1. It will also be possible to compare this study’s data to the data in Table 2 concerning whether or not programs require one or two semesters of Foundations I courses (Petkus et al., 2014; Siegfried et al., 1991a; 1991b).

Comparing their findings on economic core requirements by institution type to past studies, Petkus et al. (2014) found that for each of the six course requirements they collected data

on, the percent of economics major programs requiring them increased. As seen in Table 1, and in further detail in Table 2, “[t]he principles course is nearly universally required in all major programs” (Petkus et al., 2014, p. 57). Petkus et al.’s (2014), “data show a modest increase in the intermediate requirements since 1980, when 92.5 percent of major programs required Intermediate Microeconomics and 90.3 percent required Intermediate Macroeconomics (Siegfried and Wilkinson 1982)” (p. 58). It is then reported that, “91 percent of major programs across all institution types require statistics”, up, “9.1 percentage points”, from Siegfried and Wilkinson’s (1982) data in 1980 that found, “84.8 percent of economics programs required statistics” (Petkus et al., 2014, p. 58).

The requirements for Econometrics and Calculus are neither as prevalent nor consistent as the other four courses requirements that Petkus et al. (2014) report on. Petkus et al. (2014) found 40.7% of all major programs required Econometrics, but that their, “data show stark differences across institution types in econometrics requirements” (p. 58). Specifically, only 14.7% of Baccalaureates, 51.4% of National Universities, 32.4% of Masters, and 46% of National Liberal Arts Colleges require some sort of Econometrics course (Petkus et al., 2014, p. 58). By contrast, “Siegfried and Wilkinson (1982) reported that 5.9 percent of major programs required econometrics in 1980” (Petkus et al., 2014, p. 58).

Petkus et al. (2014) report that, “[a]pproximately two-thirds of major programs require Calculus, though requirements vary from about one-third [33.8%] at Baccalaureate Institutions to about four-fifths [78.9%] at National Universities” (p. 58). Of the programs in the other two institution types, 70.1% of National Liberal Arts Colleges and 53.1% of Masters institutions require calculus (Petkus et al., 2014). By contrast, “[i]n 1980, only 21.6 percent”, [of all major programs] required calculus (Siegfried and Wilkinson 1982)” (Petkus et al., 2014, p. 58).

Institution Rank

While examining institution type is relatively common, Petkus et al. (2014) imply that few previous studies include rank as a variable, at least relative to studies of course requirements. Those that do include rank as a variable sampled from, “only top institutions”, impacting validity and generalizability of such studies (Petkus et al., 2014, p. 58). This may also be seen as one of the reasons why sampling is not a truly effective or necessarily worth-while approach to analyzing the composition and quality of undergraduate economics curricula as a whole (Petkus et al., 2014).

Notably, Petkus et al. (2014) state that an advantageous feature of their methodological choice to use the *U.S. News and World Report*, “is the ability to examine differences by school rank” (p. 58), yet only briefly discuss findings relating to rank. Petkus et al.’s (2014) presentation and analysis of other data, including lesser variables, were discussed at relative length, and displayed in tables. Rank stands out in that there was no table or display and is covered in one paragraph, making it the least discussed variable in Petkus et al. (2014). This would seem to undermine the purpose of emphasizing the importance of such data. In preparing to gather rank and institution data for the study, the likely reasons behind Petkus et al.’s (2014) analysis of rank became apparent, and gave rise to aspects of this study’s current design.

To study rank, Petkus et al. (2014, p. 58) compare the core economic requirements of the Top 50 National Universities to all the National Universities ranked 51 and lower, and perform the same analytical procedure on the National Liberal Arts Colleges. The only findings mentioned are that, “[i]mportant differences between calculus and econometrics emerge” (Petkus et al., 2014, p. 58). Specifically, “[a]mong the top 50 National Universities, 97.0 percent of major programs require calculus, and 71.3 percent require econometrics” (Petkus et al., 2014, p.

58). Among those National Universities, “[b]elow the top 50, the figures fall to 74.8 percent and 47.0 percent, respectively” (Petkus et al., 2014, p. 58). Similarly a, “drop-off is seen among Liberal Arts Colleges with 89.2 percent and 57.8 percent of major programs at top 50 schools requiring calculus and econometrics, compared to 62.5 and 41.3 percent at lower ranked schools” (Petkus et al., p. 58). A representation of these results may be seen in Table 3.

Though Petkus et al. (2014) do not explain this, the *U.S. News and World Report* does not rank schools in one giant group; institutions are only ranked against other institutions of the same institution type. To make things more interesting, the *U.S. News and World Report* breaks down each of their “regional universities” (“masters”) and “regional colleges” (“baccalaureates”) into four region based sub-categories and then ranks each as a function of their regional sub-category. Thus, rather than being one aggregate ranking of institutions, the *U.S. News and World Report* is in fact composed of a total of ten independent institution ranking lists.

Each of these ten rank lists have their own institution(s) ranked first place, with numerous ties resulting in multiples and gaps for a given rank. Additionally, each of the ten rank lists contains fairly proportionally large pools of unranked institutions, making comparisons of a top group to a bottom or remaining group logical for gleaning rank related insights from such data. However, compared to National Universities and National Liberal Arts Colleges, all of the other eight ranking groups were and are smaller in number, with some being to such an extent that comparing the Top 50 to the bottom remaining would result in very small comparisons. In this context, Petkus et al.’s (2014) decision to only examine how course requirements vary by institution rank for National Universities and National Liberal Arts Colleges, makes sense.

For these reasons, this study planned on simply replicating Petkus et al.'s (2014, p. 58) procedures, comparing major programs in the Top 50 National Universities and the Top 50 National Liberal Arts Colleges to their respective groups of remaining institutions and programs. This was to allow for ease of comparison with Petkus et al.'s (2014, p. 58) findings, and possibly illustrate additional differences associated with rank. However, just before the conclusion of analyses and findings, this study's author figured out how to apply Petkus et al.'s (2014, p. 58) methods of rank analysis to the two remaining institution types, Regional Universities and Regional Colleges. Thus, this study is the first to present a rank analysis of the Foundations requirements for economics majors in Regional Universities and Regional Colleges

Special Requirements

To be detailed in the methods and discussion, a software application was designed and commissioned as a necessity for data collection and analysis. Some features of this software made it easy to collect and report data on Siegfried and Wilkinson's (1982) data on the, "frequency of special requirements for economics major" (p. 132; see Table 4). For this reason, this study will also briefly report on such requirements and compare them to Siegfried and Wilkinson (1982).

Credit Hours

As a relatively minor feature of this study, also largely due to ease, this study will report on the distribution of credit hour requirements for economic core requirements, as opposed to Petkus et al.'s (2014) report on the, "core economics courses" (p. 58). The former refers almost exclusively to those Foundations requirements that are required by an economics program's core requirements; the latter includes course requirements fulfill a Foundations requirement, but are

not of an economics program. Aside from differences in rank and institution type, Petkus et al. (2014) also collected and analyzed data, “on required credit hours” (p. 57). Recent studies have not examined such factors, in spite of there being indications of a general decline in the number of credit hours required by economics majors (Petkus et al., 2014). Petkus et al. (2014) state that their credit hour estimates should be considered a lower bound.

This is because they counted courses and approximate credit hours per course, in addition to omitting non-math and non-economics required courses. Specifically, Petkus et al. (2014), “approximated the minimum number of economics credits by assuming three credits per course” (p. 58). Petkus et al. (2014) state that they, “recorded only required economics, calculus, and statistics courses, not required courses in other disciplines as was done by Siegfried and Wilkinson (1982)” (p.58). Within the context of their preceding review of economic core requirements, it would seem that they collected data on the presence of seven courses, but present these seven courses as six courses (see Table 1 and Table 2) (Petkus et al., 2014, p. 56-58).

Not clear until realizing that the first category Petkus et al. (2014, p. 59) report on, 0-21 credit hours, must consist of up to seven courses, is that, unlike their data on economic core requirements, their credit hour data reflects *all* courses required by an economics major program. That is, provided it falls under the above definition. As a result, Petkus et al.’s (2014) report on the credit hours required by economics major programs includes more courses per program than the data on the satisfaction of economic core requirements they initially discuss.

Even with this, “lower bound estimate”, Petkus et al. (2014) found that, “[t]he decline in credit hours observed from 1950 to 1980 has halted, if not reversed” (p. 58-59). The bulk, 74.9%,

of their programs required 22 to 33 credit hours (Petkus et al., 2014, p. 59). Petkus et al.'s (2014) table reporting on the minimum number of required credit hours can be seen in Table 5.

This study is concerned only with collecting data on the minimal fulfillment of Foundations (economic core) courses, as outlined, leaving the cataloguing of specific course data to future studies; Study 1b and Study 1c. The fulfillment of the Foundations requirements is documented in this study via eight economic core courses (this study accounts for all-in-one intro to economics courses). For this reason, this study cannot exceed 24 credit hours if it multiplies the fulfillment of economic core requirements per program by three, and in this sense cannot be easily compared to Petkus et al.'s (2014) data on credit hours at the moment. This study instead reports the distribution of credit hours in increments of three, as opposed to Petkus et al.'s (2014) increments of seven credit hours.

Research Problem

The existing data sets concerning the composition of the undergraduate economics curriculum are either outdated, feature validity threats, or are narrow or incomplete in their attempts to assess the composition and features of the undergraduate economics curriculum (Bosshardt et al., 2013; Brue, 1996; Dean & Dolan, 2012; Petkus, 2014; Scott & Siegfried, 1999; Siegfried, 2000; Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982; Sweeney et al., 1983; Taylor, 1950). In particular, they often fail to address or adequately reveal the extent to which, “practice conform[s] to principle” (Petkus et al., 2014, p. 56). Thus, the qualities and trends of the undergraduate economics curriculum are difficult to ascertain.

Purpose Statement

The purpose of this qualitative study is to conduct a census on the curriculum for population of undergraduate economics major programs in the U.S., primarily based on the research designs of Petkus et al. (2014) and Siegfried and Wilkinson (1982). Descriptive statistics are used to provide a cursory analysis and summary of the data, both as collected and as compared to Petkus et al. (2014) and Siegfried and Wilkinson (1982). The data collected and analyzed in this study will update and fill gaps in data concerning the composition of undergraduate economics curriculum. Thus this study aims to inform ongoing debates concerning the form and function of economics and economics curricula. Data collected in this study also lays the foundation for intended follow up studies exploring and informing the challenges and solutions education, economics, and society, share in the 21st century.

General Research Questions and Hypotheses

In this context, this immediate study is concerned with three orders of questions. The primary questions seek to answer, to what extent are the Foundations courses from Siegfried et al.'s (1991a; 1991b) ideal economic core requirements for undergraduate economics majors, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics), required by undergraduate economics major programs in the U.S.? The secondary questions examine, to what extent are the courses Siegfried and Wilkinson (1982) call, "special requirements for the economics major" (p. 131-132) required by undergraduate economics major programs in the U.S.? Tertiary questions concern what amounts to miscellaneous variables that may be convenient to report on in this study if time.

Each of these broad questions has numerous operationalized sub questions and accompanying hypotheses. These operationalized sub questions and hypotheses will be handled at the end of the literature review and in the methods. That being said, this study has three general hypotheses.

First, compared to Petkus et al.'s (2014) analysis of data from 2010 on the U.S. undergraduate economics curricula, it is hypothesized that all institution types will have increased the degree to which they require the various Foundations courses. Second, it is hypothesized that, relative to Petkus et al.'s (2014, p. 58) data, requirements of undergraduate economics major programs by institution rank will reveal similar differences, with some new ones to report. Third, in regards to Siegfried and Wilkinson's (1982) "special requirements" (p. 131-132), it is hypothesized that the percent of institutions requiring special requirements will have generally increased, with some special requirements being found to have increased more than others.

Methodologies – Two Scales

Multiphase Mixed Methods – The Overarching Research Design

As previously stated, a purpose of this study is to introduce an initial framework, data set, and analysis, setting the stage for several intended follow-up studies, and contributing to ongoing discourse in economics and education. Together, this study and the follow-up studies about to be briefly outlined, are technically termed (and intended as) a multiphase mixed methods research design (Creswell, 2012, pp. 534-575; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). A multiphase mixed methods design, "examine[s] a problem or topic through a series of phases or separate studies", in order, "to address a set of incremental research questions that all

advance one programmatic research objective” (Creswell, 2012, pp. 547; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008).

There are several major elements to a multiphase mixed methods research design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). Creswell (2012) states that, “mixed methods researchers use either a convergent, explanatory, exploratory, or embedded design [italics removed]”, and that, “[t]he multiphase design builds on the basic mixed methods designs and adds to these designs multiple phases ... over time” (pp. 547). Any given, “phase may have a combination of concurrent and sequential mixed methods designs” (Creswell, 2012, pp. 547).

Another major element of a multiphase mixed methods design is the clear identification, “of projects or phases that help address a larger program objective [italics removed]” (Creswell, 2012, pp. 547). The researchers conducting multiphase mixed methods research, “also need to be experience in large-scale research [italics removed]” (Creswell, 2012, pp. 547). Additionally, “mixed methods researchers need to interrelate the different phases or projects so that they tie together to address a common research objective [italics removed]” (Creswell, 2012, pp. 547). Normally, “one phase or project leads to another and, in this sense, the phases or projects build on (or inform) each other throughout” the series (Creswell, 2012, pp. 547).

Creswell (2012) explains that, “[t]he strength of this design lies in the use of multiple projects to best understand an overall program objective” (pp. 547). Creswell (2012) also states that multiphase mixed methods designs can pose several challenges. The first is, “forming a research team that can work comfortably together given diverse method orientations” (Creswell, 2012, pp. 547). The second is, “making sure that the phases or studies link together” (Creswell,

2012, pp. 547). The third is, “having all of the studies provide insight into an overall program objective” (Creswell, 2012, pp. 547).

Regarding the first challenge, at the moment these studies will only have one primary author. In this study, and likely most future studies until Phase Two is complete, all other persons involved in the studies will be paid research assistants or commissioned professionals, all following instructions per this author. Regarding the second and third challenges, this author initially conceptualized this study as a singular convergent (meaning qualitative and quantitative data and analysis occur simultaneously and then are compared and interpreted) mixed methods study (Creswell, 2012, pp. 540-541).

The plan was, and is, to create the most comprehensive quantitative census on undergraduate economics curricula to date, paralleled by a qualitative critical collective case study (Creswell, 2012, pp. 465-466) of the economics discipline as it relates to education, power, and the world. The study would have culminated in the creation and application of an instrument designed to critically perceive, assess, and help improve economics curricula. As the creation of such a study progressed, it became apparent that such a study would be better executed as several focused but interrelated studies, thus the multiphase mixed methods design (Creswell, 2012, pp. 547). The point is that the multiphase design this author intends to execute was initially designed as a single cohesive study that was then subdivided for feasibility. For this reason, concerns about the phases of study linking together should be significantly lessened, as they already do.

Finally, an element rather than a challenge, is that the researcher in charge has experience with large sets of data (Creswell, 2012, pp. 547). While this researcher has not previously overseen this formal of a study, this author has experience compiling, studying, and employing a

variety of qualitative, quantitative, and transformative projects of similar scale and complexity. Additionally, this researcher has a bachelor's of interdisciplinary studies degree and is constantly exploring a wide variety of subjects organized around various themes related to the phenomena of concern.

The overall objective of these studies is to explore and inform challenges the discipline of economics, the education system, and the forces of globalization all share, ultimately developing technological solutions, conceptual frameworks, and methods that address these challenges. For better clarity, this overall objective serves three concrete purposes. The first purpose of these studies is to explore and inform ongoing debates concerning the future of the discipline of economics and how it is taught, both in practice and in principle. The second purpose of these studies is to explore how the past, present, and future of economics and economics education relate to and represent crucial patterns, dynamics, and institutions in the U.S. and the world. Finally, the third purpose of these studies is to outline potential technological and organizational solutions that may empower faculty and departments, in economics and eventually in general, to better understand, design, and improve their own curriculum.

In this author's experience, the undergraduate economics curriculum and debates surrounding it represent a unique intersection, and thus microcosm, of the aforementioned factors and challenges of economics, education, and globalization. Knowledge capital is what shapes an economy and, more importantly, allows it to continue to grow (Greenspan, 2008; Mankiw, 2013). Knowledge capital is primarily a product of a society's educational systems, and a society's educational systems are perhaps best understood and defined as curricula or "the curriculum" (Dillon, 2009). In this sense, the form, function, growth rates, and growth limits in an economy, and thus the forms and functions of human needs and wants, potential and

development, are primarily a function of knowledge capital, and thus largely of curricula (Anyon, 1980; Canestrari & Marlowe, 2013; Darder, Baltodano, & Torres, 2009; Flinders & Thornton, 2013; Greenspan, 2008; Mankiw, 2013; Ritzer & Stepinisky, 2014; Whaples, 2007).

As the challenges faced by economics, education, and globalization are complexly interrelated, research and solutions must account for this. For this reason, the overall objective of the multiphase design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) is primarily achieved by collecting and analyzing data on numerous aspects of the undergraduate economics curriculum. The studies in the multiphase series may be improved and repeated over the years, creating a large amount of longitudinal data. Also, because of the commonalities underlying the challenges faced by economics, education, and globalization, findings and solutions generated in exploring the economics curriculum may be generalizable.

Phase One. The primary objective of Phase One is to collect and analyze a wide variety of (primarily) qualitative data on the content, context, and outcomes of undergraduate economics programs in U.S. institutions of higher education. This is done in three phases, in part for the feasibility of this master's project, but also in part because of what is methodologically and technologically required to gather and organize such data. Specifically, it was the initial intent of this author to create and execute various processes for collecting such data that could then serve as the framework for the creation of technological solutions.

However, in early attempts at creating and executing the methods, it became clear that applications like SPSS (at least within my knowledge base) or Excel were not appropriate for the task. After consulting with a professional, it was determined that the best approach to data collection was to create a custom software application in Access. A data management

professional was then hired to create the software manifestation of this author's design specifications and feedback. Thus, the qualitative research designs to be created and executed in Phase One are paralleled by, and manifest in, the creation and development of a basic but powerful software application that may serve as the backbone of or prototype of future software.

That being said, the Phase One asks, what data on the inputs, characteristics, content, context, and outcomes of economics major programs in U.S. institutions can be compiled and integrated into a comprehensive census of the full population of major programs? Phase One primarily concerns the first overall purpose; to explore and inform ongoing debates concerning the future of the discipline of economics and how it is taught, both in practice and in principle. It is in this context that Phase One seeks to identify, explore, and integrate as much data as possible on the aspects of economics curricula just listed. The aim is the creation of a framework and baseline data set upon which the future studies of Phases One, Two, and Three may build. An extensive data base and web search has revealed numerous governmental, academic, and corporate databases and resources concerning U.S. higher education and economics.

This search for data will continue throughout Phase One, with the studies after this study being subject to added parts or improvements relative to the description in this paper. It is also possible that more studies will be added to Phase One, possibly running parallel to phase parts of Phase Two depending on timing. All of this is an acceptable approach to multiphase mixed methods designs provided they are fairly coherent and justified in their outset or overall objective (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008).

Study 1a. Study 1a is this study. As stated, it is concerned with completing a census on the Foundations (Siegfried et al. 1991a; 1991b) and Special Requirements (Siegfried &

Wilkinson, 1982) for the population of undergraduate major programs in U.S. institutions, with a focus on the data's relationship with institution type, similar to Petkus et al.'s (2014) approach. In constructing such a data set, other variables are also collected. These are primarily things like institution rank, the name/type of economics major programs, and the name/type of departments, and colleges/schools (i.e. not institutions) they are hosted in.

As previously stated, the data in this study (Study 1a) will also be compared to previous studies, namely Petkus et al. (2014) and Siegfried and Wilkinson (1982). As these previous studies used descriptive statistics, this study will also report on and compare data via descriptive statistics. The process and content developed in this study will then be used to develop the processes and software necessary for the completion of future studies.

Study 1b. This study will begin after this master's project. It will concern the creation, execution, and cursory analysis of a census on what this author has deemed the "non-economics core" and "major elective" requirements and offerings of undergraduate economics major programs. There would appear to be very little data, if any, since Siegfried and Wilkinson (1982) concerning such variables. Such courses are of crucial importance in distinguishing the qualities of a major program. Siegfried et al. (1991a) and Siegfried et al. (1991b) make very clear that such course variables are the essence of Breadth and Depth requirements.

Further, data on such courses are vital for qualifying, quantifying, assessing, and transforming numerous factors of ideals and practices of economics and economics curricula. Thus, the purpose of Study 1b is to expand the scope of data collection on the course offerings and content of undergraduate economics major programs in preparation for Phase Two. Phase Two will critically explore, define, and operationalize said, and related, variables that concern or

describe the qualities of the undergraduate economics major and other related social factors. In this context, Study 1b simply expands upon and adapts Phase One and Study 1a's questions, asking what are the "non-economics core" and "major elective" requirements and offerings for the population of undergraduate economics major programs in the U.S.?

The census in 1b will be very similar to the design and methods laid out in this study (Study 1a), and much of it was actually designed in the process of creating this study. Study 1b will examine the same population of undergraduate major programs in U.S. institutions. The frameworks and technology of Study 1a will be adapted for the purposes of Study 1b, particularly to accommodate the unique formatting of such course requirements.

Study 1c. Discerning the general education and course requirements that an institution, school/college/division, or department may have, is key to ensuring there are no blind spots to assessing the content and context of an economics major program. This is particularly true when attempting to assess the extent to which liberal arts colleges require certain economics core, special, non-economics core, and major elective courses, as their general requirements cover much. This will also be a particularly useful data set in Phase Two, which will attempt to critically explore and test the data from Phase One, and could be invalidated by such a blind spot. The data collected on general education requirements relating to an economic major program is more similar to the data collected in Study 1b, so this study will likely be identical or very similar to Study 1b.

Study 1d. This study will collect numerous additional sources of rank and institution data not formally collected or reported on in previous studies of economics curricula, whether by this author or others. These data sets will be integrated with the data from all previous Phase One

studies, which were based upon the *U.S. News and World Report* data and rankings. Once integrated, further analysis of data concerning alumni, incoming students, current students, faculty, finances, demographics, departments, programs, and institutions will be possible. This will allow for more refined and critical analysis of the undergraduate economics curriculum and its relationships with factors of Phase One, like rank, and particularly when analyzed via the instrument to be built in Phase Two.

Phase Two. Phase Two seeks to accomplish three goals in order to critically explore and analyze principles and practices of the undergraduate economics curriculum, as established by Petkus et al. (2014), Siegfried et al. (1991a), Siegfried et al. (1991b), and Siegfried (2012). The first goal is to critically explore relationships between undergraduate economics curricula, and the forces of globalization, education, and economics as a discipline. Critical examination of the past, present and future of these concepts, their components, relationships, and contexts, demands a representative plurality of scientific and disciplinary perspectives.

In turn, properly identifying and critically exploring the terms, constructs, and themes of these interdisciplinary perspectives requires their nuances of similarity and difference, in assumptions, meanings, and implications, be thoroughly compared and discussed. Such a process, as primarily carried out in Study 2a, will yield a comprehensive set of highly refined variables. This is done for its academic merit and the purposes of the second goal of Phase Two; to operationalize the variables explored and defined in Study 2a as a mixed methods instrument (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) which may be applied to the data from Phase One. The pursuit of this second goal is manifest in Study 2b.

This third goal, manifest in Study 2c, is to actually fully apply, and then refine, the mixed method instrument (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) developed in Study 2a and Study 2b. In pursuing and completing these three goals and studies, what will almost certainly be the most comprehensive tool for qualifying and quantifying economics curricula will have been created. Further, students, researchers, institutions, and companies will be able to apply the instrument to the most comprehensive data set on undergraduate economics curricula, pursued primarily in Phase Three.

Study 2a. There is much to be said concerning the social forces that influenced, and were influenced by, the development of economics, as a discipline, curricula, policy, or system. However, as there are no truly comprehensive data sets on the undergraduate economics curricula, there are similarly no comprehensive tools critically assess past, present, and potential future nature, elements, and practice (Dillon, 2009; see Figure 1) of the undergraduate economics curricula. Study 2a critically explores the relationships between forces and paradigms of education, globalization, economics, power, knowledge, and citizenship, as they are embodied in and shape the undergraduate economics curricula and our world. Study 2a's critical exploration may then be used construct and define a variety of variables and concepts, some touched upon in the present study (Study 1a), that may then be operationalized for analysis of Phase One.

Study 2a is a qualitative collective (or multiple instrumental) case study methodology (Creswell, 2012, pp. 465-466), with critical-ideological and postmodernist foundations (Crotty, 1998; Hammersley, 2012; Neuman, 2011; Ponterotto, 2005). It will critically explore, identify, and construct variables embodying ideals, practices, and challenges of education, globalization, economics, power, knowledge, and citizenship. Study 2a is a qualitative collective (or multiple instrumental) case study methodology (Creswell, 2012, pp. 465-466) because it describes and

compares key scientific paradigms and disciplines, surrounding and including economics, each as instrumental case studies. Collectively, these case studies will explore the past, present, and future of the ideals, practices, and implications of undergraduate economics curricula in the U.S., and as guided by Dillon's (2009; see Figure 1) "questions of curriculum".

Study 2b. In Study 2b, the variables and constructs of Study 2a will be operationalized and used to create variety of mixed methods instruments (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). Study 2b is concerned primarily with processes of instrument design and initial validation. These mixed methods instruments may then be applied, in Study 2c, to Phase One's data.

Study 2c. Study 2c will take the instruments created in Study 2b and apply it to the data collected in Phase One. In addition to reviewing the initial findings of the instruments, the instruments and their results will be further assed for validity threats, and recommendations for improvements, based upon initial testing and analysis, will be made and integrated. There may be a follow up study that occurs to refine the instrument if necessary.

Phase Three. Phase Three is concerned with three goals, to be pursued after the completion of Phase One and Phase Two. The first is to use forms of action research (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601) to coordinate the processes and findings of the multiphase series with various groups and individuals that influence the discipline and curricula of economics. The second is to use the frameworks and data of Phase One and Phase Two to more efficiently gather and integrate additional data on the content of economics curricula and their courses, particularly course

syllabi and texts. The third is to generalize the processes, findings, and technology of the multiphase series as a whole, by beginning to adapt them to other disciplines and their curricula.

Study 3a. Study 3a will employ transformative processes to court partners and investors interested in expanding and refining the content and analysis of previous and future studies. This would ideally include taking the data and technology generated up to this point and beginning to make it so that teachers, students, institutions, and privileged researchers could each contribute to and utilize the data. Such a regulated open source format combined with cutting edge data organization and visualization applications could usher in a new era of curricula study and design.

that will be employed is anr(Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601),,Action research refers to a family of approaches which may, be paired with or utilize any scientific paradigm, discipline, methodology, method, profession, or task, as deemed appropriate (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601). Action research, and particularly sub-types like participatory action research, differs from other research approaches and paradigms in several crucial ways.

Most research approaches and paradigms demand that researchers remain detached, and not seek to change or interfere in reality, and particularly policy (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601; Hammersly, 2012; Nueman, 2011; Phillips & Burbules, 2000). Further, when researching, and indeed even when affecting reality and policy, researchers generally think and act as elite experts, and as such passively and actively devalue or disregard the perspectives, realities, and knowledge of subjects.

Often, at best, research consists of individual, maybe even related, studies published slowly in academic journals, which may passively or actively be brought to the attention of someone with the power to implement top down change years after the data was collected and analyzed. If the original subjects, particularly those facing imminent issues, are lucky, that person in a relevant hierarchical position will find valid research, and clumsily and slowly attempt forced changes (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601).

Such detached and top down processes almost never actually help those intended, certainly not in a timely or empowering manner, and almost always favor the status quo and those with power. Action research seeks to upset these academic norms. Specifically, action research employs iterative and nested cycles of identifying questions or problems, creating a plan to explore or address the identified questions and problems, executing the plan, and reflection (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601).

These cycles differ from typical research in both their processes and character. Specifically, whereas most researchers stop their study and publish after the completion of some form of reflection, action research studies may repeat these cycles as often as needed within one study, or choose to break the cycles into individual studies, if only for some publication s. Further, and perhaps most important, action research approaches always seek to identify and integrate the knowledge and interests of all that may have a stake in or be impacted by the research efforts (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601).

This typically occurs at every stage in an action research cycle, often with emphasis on the subjects and stakeholders working with the researcher to identify questions and problems, and how to address them. This stands in contrast with the norm of an outsider dictating, often irrelevant or incorrect, problems and solutions, and then leaving after the researcher's own objectives are complete and ready to be published. Ideally, when action researcher(s) conclude their involvement, the stakeholders and subjects are left with real skills and data they may continue to employ as needed. Thus, when properly implemented action research ensures that identified challenges and solutions are more relevant, more valid, more easily adapted or refined, and more likely to endure in the short and long term after the researcher has left (Brydon-Miller, 2009; Coghlan & Brannick, 2014; Coghlan & Brydon-Miller, 2014; Creswell, 2012, pp. 577-601). **Study 3b.** This study will seek to fill in more refined details concerning the content of economic major program courses that have been identified at the time of this study. With the previous studies having collected the institutional contact information and the web address to the course requirements for each economic major program, details may be acquired in two ways. First, many institutions and programs list the description and/or syllabus of their courses on their websites. Thematic text analysis could be applied to collected faculty CVs, courses descriptions, institution catalogues/bulletins, syllabi, and listed course readings.

The second way this study could acquire additional course information is by approaching institutions and corporations for various data. Such information could include course artifacts just mentioned, textbook, journal, and library data. Such data could be leveraged or obtained via commercial or non-profit partnerships, payment, or simple granting of requests. Data in Study 3b will be collected, integrated with the course and major program data previous studies, and analyzed all via the "Curricula Analyzer" software.

By this point, the “Curricula Analyzer” software will have integrated the instruments developed in Phase Two, so they will be one of the tools used to assess the course content and faculty. The data collected in Study 3b would significantly refine analysis of the data generated in previous studies on courses and other aspects of the undergraduate economics curricula, which was primarily based on titles.

Study 3c. If the previous phases and studies are successful, Study 3c will be concerned with adapting the processes, findings, and technology of the total multiphase project to other curricula. Potential starting points include k-12 and graduate economics curricula, education related major programs, philosophy, business degrees, and areas of political science such as international relations, international development, and political economy.

Immediate Methodology - Qualitative Census Design

This master’s project updates and expands upon past studies of the economics curricula, asking, to what extent are the ideal standards of the undergraduate economics curricula put into practice? The present ideals were established primarily by Siegfried et al. (1991a) and Siegfried et al. (1991b), and reaffirmed by Siegfried (2012) and Petkus et al. (2014). Petkus et al. (2014) focus on the economics core courses; courses Siegfried et al. (1991a; 1991b) categorize as either, Foundations I, (Intro to Microeconomics and Intro to Macroeconomics) , Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), or Foundations III (Calculus, Statistics, and Econometrics) (p. 21-23).

As just discussed, this study is the first of a series of studies, collectively a multiphase mixed methodology design (Creswell, 2012, pp. 534-575; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). This immediate study begins to interpret, modify, and expand Petkus et

al.'s (2014) census methodology and methods by integrating variables and study design elements found in Siegfried and Wilkinson (1982), Siegfried et al. (1991a), and Siegfried et al. (1991b). In relatively specific or minor ways, this study's methodology and methods are also informed by other studies of the undergraduate economics curricula (Scott & Siegfried, 1999; Siegfried, 2000; Siegfried & Bidani, 1992; Sweeney et al., 1983; Taylor, 1950).

Petkus et al.'s (2014) census methodology and method is significant for several reasons. One reason is that Petkus et al. (2014), "are the first to describe the core economics curriculum requirements for economics majors at all American Colleges and Universities" (p. 57). This is, "as opposed to a sample of institutions" (Petkus et al., 2014, p. 57). This is important because, Petkus et al.'s (2014) population data reveal important differences in curricular requirements across institution types and by rank" (p. 57). These differences are otherwise missed when surveys and samples, particularly solely of top ranked schools, are used; approaches all previous studies of the economics curricula have relied on (Petkus et al., 2014, 56-58).

Petkus et al. (2014), "also present findings on required credit hours and the sequencing of the principles courses, questions not addressed in recent papers" (p. 57), though this study does not collect data on the sequencing of the Principles courses. Finally, Petkus et al.'s (2014) general framework allows for several comparisons to previous studies, the most notable being Siegfried and Wilkinson (1982) and Taylor (1950). However, the focus of Petkus et al.'s (2014) census, while impressive and thorough for its scope, is very narrow, and the study as described poses challenges, particularly in terms of replicating their reported methodology and methods.

Petkus et al.'s (2014) study, including notes but excluding references, is pages six and a half pages long, with two of those pages being either graphs or the title and abstract. It is mostly devoted to reporting its findings and comparing them to previous studies, but is practically

devoid of context. Notably lacking are definitions of certain variables, thorough discussion of potential validity threats that become apparent in attempts at replicating aspects of their study, and a thorough discussion of the limitations of their study, though they do touch upon some. Finally, Petkus et al.'s (2014) data was collected in 2010, citing the *U.S. News & World Report*, published in 2009 as the report is published a year before the title in order to guide consumers, so it would seem like an appropriate amount of time has passed for a follow up study.

In this context, the focus of this study is on the qualitative collection, analysis, and exploration of primarily categorical variables that compose elements of the undergraduate economics curricula, via a new curricula census design. Data is collected on the entire population of undergraduate economics major programs offered by institutions in the U.S., as listed, classified, and ranked by the most up to date *U.S. News & World Report*. Analysis of the data collected in this study will be relatively cursory. Analysis will be performed via descriptive statistics and focusing on course requirement differences by institution type and rank, as defined and employed by 2017 *U.S. News & World Report* (2016) (Petkus et al., 2014). A slightly modified version of Siegfried and Wilkinson's (1982) "special requirements" (p. 131-312), will also be collected and reported on in the same manner.

This study's methodology and methods were chosen and modified for three general reasons. These reasons being the initial ease of collection, ease of comparison to the most comprehensive data sets to date Petkus et al. (2014) and Siegfried and Wilkinson (1982), and ease of progression through the future phases. Though time consuming, a full census is easy to execute and significantly build upon, making it well worth the while.

Thus, when studies 1b and 1c are complete and combined with this study's frameworks and data, several things will be achieved. First, to the best of this author's knowledge, the data

set will be the most thorough census, in process and in content, of the undergraduate economics curricula in the U.S. to have been created and completed to date. Second, a powerful software application for data collection and analysis will have been created. This software has already gone through numerous phases of testing and improvements, and will continue to undergo expansion and revision throughout the phases. The software application custom developed for this study will soon be expanded for studies 1b and 1c, as the methodology and methods have been complete for some time.

This software will continue to be updated after the completion of Phase One, integrating with Phase Two and three as they progress. The completion of this study will yield a framework, instrument, and baseline data set, all upon which further quantitative, qualitative, and transformative studies and applications may be built. The collected data will eventually also be structured and made available, commercially or otherwise, so that replicable or improved designs may be employed periodically, if not actively, for longitudinal study economics other curricula.

In sum, the purpose of this qualitative study is to conduct a census on the curricula for population of undergraduate economics major programs in the U.S., primarily based on the research designs of Petkus et al. (2014) and Siegfried and Wilkinson (1982). Descriptive statistics are used to provide a cursory analysis and summary of the data, both as collected and as compared to Petkus et al. (2014) and Siegfried and Wilkinson (1982). The data collected and analyzed in this study will update and fill gaps in data concerning the composition of undergraduate economics curricula. Thus, this study aims to inform ongoing debates concerning the form and function of its principles and execution. Data collected in this study also lays the foundation for intended follow up studies exploring and informing the challenges and solutions education, economics, and society, share in the 21st century.

Overview of Data Collection.

This study was initially conceived and designed in fall of 2015. From 2016 through August 2017, various frameworks and approaches to defining, operationalizing, and analyzing this study's variables were created, tested, and refined. The results of this process were used as the blue prints for the creation of a software application tailored to the purposes and specifications of this study. Further testing of the software's design and functionality informed the final details of operationalizing variables that are used for analyses in the findings section. After the software, variable definitions, and data collection processes were appropriately tested and written out, several paid research assistants with either research or information technology experience and of known character were trained.

With the data base created by merging the *2017 U.S. News and World Report* (2016) data with the U.S. Department of Education's (2017) data, set serving as the population of institutions that this study collects data on, institutions are listed alphabetically in the software. After at least two hours of training time with this study's author, research assistants were assigned a letter or set of letters, for which they were to complete all data entry for all the institutions of the letter. Guiding their process was a creation deemed the "Curricula Analyzer Guide", which is slightly modified and presented in the study's methods.

In addition, the software contains a "data pending" box and a note box for research assistants to enter any notes (Figure 2). These two functions allow research assistants to flag and note any questions, issues, or notable things they encountered in data collection for a specific program. Research assistants were also encouraged to contact this author if there were any problems.

General variables. Guiding the census design of this study, and much of future studies' frameworks for data collection and analyses, are several variables from previous studies that frame this (Petkus et al., 2014; Siegfried & Wilkinson, 1982). Collectively these may be thought of as subcategories of "institution data", "economic major program data", and "course data". These in turn shape the general research questions and hypotheses of this immediate study. These subcategories and their general variables, questions, and hypotheses will be described here in broad terms before being broken down into an operationalized form, primed for analysis.

Institution data. "Institution data" is based upon two data sources, compiled and cross referenced before data collection on the courses of undergraduate economics curricula began, in order to create the population of institutions this study and future phases examine. First, the U.S. Department of Education's (2017) "Database of accredited postsecondary institutions and programs" was downloaded in Excel format. This database contains a variety of information on all accredited postsecondary institutions in the U.S. It is an easy way to quickly gather institutional data, including various institution identification codes, as well as the name, mailing address, web address, city, and state.

However, the U.S. Department of Education's (2017) data base includes all postsecondary institutions. This means that trade schools, schools only granting associates degrees, and other institutions not listed by the *2017 U.S. News and World Report* (2016) must be filtered out. This was done by cross referencing the U.S. Department of Education's (2017) data with the population of institutions, both ranked and unranked, listed by the *2017 U.S. News and World Report* (2016). In the process, the *2017 U.S. News and World Report* (2016) institution types and institution ranks, the most recent at the time of this study, were attached to the corresponding institution data from the U.S. Department of Education (2017).

There are several advantages to having combined these two data sets. The first is easy data entry, as the *U.S. News and World Report* data must all be collected and put in by hand, so using it as a source for institution name, location, and address would be time consuming. Another advantage is that the *U.S. News & World Report* has a variety of other data sets, and for that matter tools and software to navigate and manage it if you pay \$10,000 or put it in by hand, things that the future studies will aim to thoroughly take advantage of. Either way, the data gathered in this study, particularly on the courses, maybe easily compared to Petkus et al. (2014) and to Siegfried and Wilkinson (1982). Finally, this study's inclusion of rank data, though only subject to limited analysis for now, will also provide a baseline of data and analysis that can be compared to other ranking systems and their future changes.

U.S News institution type. Other studies data bases and ranking systems may classify institution types in a variety of ways. It would seem that they are almost always based on the version of the *Carnegie Classifications* (Indiana University, n.d.) that were up to date at the time of the study. Siegfried and Wilkinson's (1982) operationalized version of the Carnegie Commission on Higher Education's (1973) classifications can be seen in Table 6. Petkus et al.'s (2014) uses the 2010 *U.S. News & World Report* (2009) institution types, which are in turn based on the 2005 *Carnegie Classifications* (Carnegie Foundation, 2006). How the 2010 *U.S. News and World Report* (2009) condenses and applies the 2005 *Carnegie Classifications* (Carnegie Foundation, 2006) can be seen in Table 7.

Both the *Carnegie Classifications* (Indiana University, n.d.) and the *U.S. News & World Report* classifications have since been updated (Morse, 2009; Morse et al., 2017). These updates as they pertain to the 2017 *U.S. News and World Report* (2016) can be seen in Table 8. Notably, the *U.S. News & World Report* classifications have since renamed two of their institution

categories; Masters was renamed Regional Universities, and Baccalaureates was renamed Regional Colleges (Morse, 2009; Morse et al., 2017). Additionally, the *2017 U.S. News and World Report* (2016) institution rankings for Regional Universities and Regional Colleges are each subdivided into four regional divisions for ranking. More specific details from the *2010 U.S. News and World Report* (2009) and *2017 U.S. News and World Report* (2016) category definitions can be seen and compared in Table 9 and Table 10 respectively.

Finally, in combining the *2017 U.S. News and World Report* (2016) and U.S. Department of Education's (2017) data set, several codes were created to differentiate and analyze these different *U.S. News and World Report* institution types. Specifically, National Universities are coded "N.U.", Regional Universities are coded "R.U.", National Liberal Arts Colleges are coded "N.L.", and Regional Colleges are coded "R.C.". Additionally, each Regional University and Regional College is associated with a regional code, as they are only ranked as regional subdivisions of each institution type; "N" is North, "M" is Midwest, "S" is South, and "W" is West. As is about to be described, this results in the *2017 U.S. News and World Report* (2016) institution rankings being composed of ten independent rank pools.

Table 6

Siegfried and Wilkinson's (1982) use of the 1973 Carnegie Classifications

Number of Sample Institutions	Classification	Description
56	Research	Institutions among leading 100 in federal research funding in 2 of 3 years; and awarding at least 50 Ph.D.s (in all disciplines) annually.
54	Doctorate	Institutions awarding at least 10 Ph.D.s annually but not included in research category.
237	Comprehensive	Minimum of 1,000 students; fewer than 10 annual Ph.D.s and at least one professional or occupational program, plus liberal arts.
87	Liberal Arts I	Scored 5 or above on Astin's selectivity index, ^a or were among 200 leading bachelor's degree schools in terms of numbers of graduates receiving Ph.D.s at 40 leading doctoral schools from 1920-66
106	Liberal Arts II	Liberal arts colleges that did not meet the criteria for Liberal Arts I
6	Other	Includes military academies, engineering schools, and other

Note. Permission Pending

Table 7

Institution types – 2010 U.S. News categories and corresponding 2005 Carnegie categories

Carnegie category	U.S. News category
Research Universities (very high research activity), Research Universities (high research activity), and Doctoral/Research Universities	National Universities
Master's Colleges and Universities (larger programs), Master's Colleges and Universities (medium programs), and Master's Colleges and Universities (smaller programs)	Universities-Master's: North, South, Midwest, and West
Baccalaureate Colleges-Arts and Sciences	Liberal Arts Colleges
Baccalaureate Colleges-Diverse and Baccalaureate/Associate Colleges	Baccalaureate Colleges: North, South, Midwest, and West

Note. Adapted from Morse (2009). Permissions Pending.

Table 8

Institution types – 2017 & 2018 U.S. News categories and corresponding Carnegie categories

Carnegie category	U.S. News category
Doctoral Universities (highest research activity), Doctoral Universities (higher research activity) and Doctoral Universities (moderate research activity)	National Universities
Master's Colleges and Universities (larger programs), Master's Colleges and Universities (medium programs) and Master's Colleges and Universities (smaller programs)	Regional Universities: North, South, Midwest and West
Baccalaureate Colleges—Arts and Sciences Focus	National Liberal Arts Colleges
Baccalaureate Colleges—Diverse Fields; Baccalaureate/Associate's Colleges-Mixed Baccalaureate/Associate's Colleges; Baccalaureate/Associate's Colleges-Associate's Dominant	Regional Colleges: North, South, Midwest and West

Note. Adapted from Morse et al. (2017). Permissions pending.

Table 9

2010 U.S. News Definitions of Institution Types

National Universities: There are 262 national universities in the country (164 public, 98 private), based on categories developed by the Carnegie Foundation for the Advancement of Teaching. The universities offer a full range of undergraduate majors, as well as master's and doctoral degrees; many strongly emphasize research.
Liberal Arts Colleges: The 266 liberal arts colleges emphasize undergraduate education and award at least 50 percent of their degrees in the liberal arts.
Universities-Master's: Like the national universities, universities-master's (as defined by the Carnegie Foundation) provide a full range of undergraduate programs and some master's level programs. They offer few, if any, doctoral programs. The 572 universities-master's are ranked within four geographic areas: North, South, Midwest, and West. Important note on the Universities-Master's rankings: The America's Best Colleges rankings are of the entire school focusing on the undergraduate program. The term Universities-Master's is a label to designate a type of school. The rankings in Universities-Master's are not of any master's program at any of the schools. No master's programs are ranked.
Baccalaureate Colleges: These institutions focus primarily on undergraduate education, just as the liberal arts colleges do, but grant fewer than 50 percent of their degrees in liberal arts disciplines. At these schools, at least 10 percent of undergraduate degrees awarded are bachelor's degrees. There are 319 baccalaureate colleges, ranked within four regions: North, South, Midwest, and West.

Note. Adapted from Morse (2009). Permissions Pending

Table 10

2017 & 2018 U.S. News Definitions of Institution Types

National Universities: There are 310 National Universities in the country (189 public, 114 private and seven for-profit). The universities offer a full range of undergraduate majors, as well as master's and doctoral degrees; many strongly emphasize research. The Carnegie classification defines them as Doctoral Universities (highest research activity), Doctoral Universities (higher research activity) and Doctoral Universities (moderate research activity).
National Liberal Arts Colleges: The 239 National Liberal Arts Colleges (20 public, 219 private and no for-profit) emphasize undergraduate education and award at least 50 percent of their degrees in the liberal arts. The Carnegie classification defines them as Baccalaureate Colleges—Arts and Sciences Focus.
Regional Universities: Like the National Universities, Regional Universities – defined by the Carnegie classification as Master's Colleges and Universities (larger programs), Master's Colleges and Universities (medium programs) and Master's Colleges and Universities (smaller programs) – provide a full range of undergraduate programs and some master's-level programs. They offer few, if any, doctoral programs. The 653 total Regional Universities (257 public, 385 private and 11 for-profit) are ranked within four geographic areas: North, South, Midwest and West.
Regional Colleges: These institutions focus primarily on undergraduate education, just as the National Liberal Arts Colleges do, but grant less than 50 percent of their degrees in liberal arts disciplines. Some of these schools have small bachelor's degree programs. The Carnegie classification defines these schools as Baccalaureate Colleges—Diverse Fields; Baccalaureate/Associate's Colleges: Mixed Baccalaureate/Associate's Colleges; Baccalaureate/Associate's Colleges: Associate's Dominant. There are a total of 334 Regional Colleges (118 public, 198 private and 18 for-profit), ranked within four regions: North, South, Midwest and West.

Note. Adapted from Morse et al. (2017). Permissions pending.

U.S. News institution rank. Throughout Phase One, and particularly in Study 1d, rank and other data from university ranking systems will be used to explore curricula content, context, and outcomes. However, rather than being one aggregate ranking of institutions, the *U.S. News & World Report* is in fact composed of a total of ten independent institution ranking lists, each with their own institution that is ranked number one. The *2017 U.S. News and World Report* (2016) states that Regional Universities and Regional Colleges are each ranked via four regional subcategories, “because in general they tend to draw students most heavily from surrounding states” (pp. 88). This fact is the likely reason behind Petkus et al.’s (2014) decision to only perform a rank analysis of major programs in National Universities and National Liberal Arts Colleges; the only two institution types with rankings that are whole and not sub-divided.

Specifically, Petkus et al. (2014) analyze rank by comparing major programs in National Universities and National Liberal Arts Colleges ranked one through 50, to major programs of those remaining institutions within their respective institution types. Of the remaining programs (those not in institutions with a rank one to 50), the data collected and reported on in both Petkus et al.’s (2014) study and this study also include Second Tier institutions. These are institutions that *U.S. News and World Report* list and classify by institution type, but do not rank.

Originally, this study only proposed and planned on replicating Petkus et al.’s (2014) methods for rank analysis, examining and comparing only National Universities’ and National Liberal Arts Colleges’ programs in the Top 50 institutions to the remaining programs within each. However, after this study’s data collection and findings were mostly completed, this author realized that the *2017 U.S. News and World Report* (2016) rankings have raw scores that are comparable within institution type. These raw scores allow the regional subcategories and their ranks to be ignored, and the true Top 50 ranked institutions to be identified relative to all of their

peers in their general institution type. Thus, for the first time Petkus et al.'s (2014) methods for rank analysis are applied to Regional Universities and Regional Colleges, with the findings also reported in this study.

Economic major program data. As a general variable, *economic major program data* contains several sub-categories of data that are captured and associated with any economics major program identified. In accordance with aspects of Petkus et al.'s (2014) definitions of an economics major program, programs are distinguished by having a unique title. Once a major program is identified and catalogued, data concerning the department and administrative location of a major program is collected and associated with the program for future analysis.

Thus, this study will collect the titles of economics major programs, their departments, and their administrative locations (i.e. school, college, or division). To this author's knowledge, no studies have examined the titles of departments offering economics major programs or how these relate to the curricula, particularly in terms of course requirements or administrative location. Similarly, no studies appear to have collected or assessed the titles of the economics major programs. Data on the administrative location (college of business, arts and sciences, or other) of the department or program was not gathered by Petkus et al. (2014), though it has been examined in past studies (Jesswein, 1982; Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982).

Existing studies addressing administrative location primarily examine its relationships with economics courses required in economics major programs (Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982) and in business major programs (Jesswein, 1982). Others examine faculty, student, and credit hour data as they vary by administrative location of economics majors

or economics departments (Scott & Siegfried, 1999). Though not reported on or analyzed in this study, the collection of such data will allow for a more in depth analysis of the relationship between the titles and structures of programs, departments, and administrative locations in future studies.

Economic major program title. Petkus et al. (2014), “classify each degree, track, or concentration with ‘economics’ in its title as its own ‘major program,’ for a total of 1,601 different programs” (p. 57). Petkus et al. (2014) report that, “[o]n average, schools offer two versions of the major, with 5 percent offering four or more” (p. 57). Petkus et al. (2014) exclude, “[p]re-professional programs (law, MBA, and so on) and majors in agricultural economics departments” (p. 61). Petkus et al. (2014) also sought to weed out programs, “deemed as offering business degrees with an economics concentration rather than an economics degree” (p. 61).

Following this definition can be problematic, as in practice determining what degree or track titles with “economics” in them should be counted is not as straight forward as it would seem. For instance, the exclusion of a business degree with a concentration of economics seems counter to Petkus et al.’s (2014) initial definition for an economics major program. However it does make sense for a study of economic major programs.

In this context, perhaps a better definition of an economics major program is any program in which the title of the degree itself has the word “economics” in it; with each “track”, “concentration”, “option”, “emphasis”, “special identifier”, “degree granted”, and their various combinations that students may choose to pursue as part of that degree being its own “major”/“major program”. Specifically, the following examples from the protocol manual given to research assistants illustrate how such a definition may work. As one example a “B.B.A. Business Economics – Finance Track” would be counted as an economics major program, but a

“B.B.A. Business – Economics Concentration” would not be counted. As another example, you would gather data on “Accounting, Economics, & Finance” or “Interdisciplinary - B.A. Philosophy, Politics, Economics, & Law - Ethics & Policy Track”, but not on “Accounting & Finance – Economics Track” and not on “Interdisciplinary - B.A. Philosophy, Politics, & Law – Economics Track”.

While this definition is more specific, in practice it has a problem in common with Petkus et al.’s (2014) definition; a problem Petkus et al. (2014) does not mention, and which this study found can cause the reported number of programs to vary, likely significantly. This problem is exacerbated by this study’s collection of Siegfried and Wilkinson’s (1982) “special requirements” (p. 131-132). Stemming from the use of both this study’s and Petkus et al.’s respective definitions are three issues, similar in nature, that pose several potential validity threats and can pose challenges for replication. These will be addressed in detail in the analysis and discussion.

Economics major administrative location title. Siegfried and Wilkinson (1982) appear to have been the first to examine data on economics curricula by the administrative location of the program. Examining similar data, Siegfried and Bidani (1992) state that in most U.S. institutions, “the undergraduate economics major is located administratively in either a college of liberal arts (or arts and sciences) or a school of business” (p. 181). Since, “few other academic disciplines are so divided among different administrative units ... economics provides an opportunity to explore whether the administrative location of an academic discipline has an effect on the curriculum” (p. 181).

This study collects the name of each “college”, “school”, or “division (when division is not referring to a department as it sometimes may), that houses a given economic major program.

This allows for a more refined analysis of the types of administrative locations that exist, what departments and corresponding economics major programs are in them, and how the curricula relates to such entities. This factor will not be analyzed or reported in this study, but will be in future studies..

Economic major's department title. No study thus far has reported on the varieties and distributions in names, types, and administrative locations of economics departments offering economics major programs. Similarly no studies have examined what types of major programs are offered by the various department types that may exist. By collecting the name of the department housing a given economic major program, future studies may perform a more in depth analysis.

Major requirements web address. The web address for the page with a given economic major program's requirements will be recorded for ease of access and quality control in this and future studies.

Major*:

offered by department*:

in the college*:

Special Requirements

- ☐ Distributional Requirements
- ☐ Specialization Requirement
- ☐ Senior Thesis
- ☐ Capstone
- ☐ Independent Study
- ☐ Comprehensive Exam
- ☐ Senior Seminar
- ☐ Internship

Core Economic Requirements

Explicit	Alternative
☒ Intro to Macro	Or ☐
☒ Intro to Micro	Or ☐
☒ Intermediate Macro	Or ☐
☒ Intermediate Micro	Or ☐
☒ Econometrics	Or ☐
☒ Statistics	Or ☐
☒ Calculus	Or ☐

☐ All In One Intro Macro-Micro

☐ Data Pending

☐ No Relevant Programs

Major Requirements Website:

Notes:

Figure 2. Screenshot of “Curricula Analyzer” Data Entry Screen.

Course Data. What follows in this course data section, is with some minor edits, from the protocol manual created for this study's research assistants, guiding their data collection and use of the data collection software. For this reason, aspects and phrases used for data collection are included but do not necessarily factor into this immediate study's analysis. There are two general categories of course data collected in this study; economic core requirements and special requirements.

Economic core requirements. Petkus et al. (2014) collected data on what they refer to as the "core economics requirements", which in their study means they only recorded, "required economics, calculus, and statistics courses" (p. 58). Though careful reading makes clear that Petkus et al. (2014) collected data on more than the minimal satisfaction of their seven reported course variables, they do not share details outside of credit hours. In contrast, Siegfried and Wilkinson (1982) report on the "percentage distribution of specific course requirements for economics major" (p.131), referring to when at least five percent of programs reported a required course.

This study is concerned the satisfaction of strict minimal foundational requirements of an economics major program (Siegfried et al., 1991a; 1991b). These are represented by eight courses, with this study breaking Petkus et al.'s (2014), "Principles of Economics" (p. 56-60), variable into Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro. To distinguish this study's objective of reporting on these minimums from the technical nuances of previous studies, and to be precise in stating what this study describes relative to future studies, this study tries to refer to these eight courses as the "economic core" requirements or courses.

Future studies will be concerned with cataloguing specific course requirements and electives by their titles, source, content, and context (i.e. required or offered specifically or in pools by economics major program, the department, college, or institution). Both Siegfried and Wilkinson's (1982) term, "specific course requirements for economics major" (p. 131), and Petkus et al.'s (2014) term, "core economics requirements" (p. 56-61), are unsatisfactory for the needs of this study and future phases.

Economic major programs almost always label what they consider to be their core requirements as such, and thus in common nomenclature Petkus et al.'s (2014) use of, "core economic courses", superficially implies a procedure akin to Siegfried and Wilkinson (1982). Perhaps aware of such an implication, Petkus et al. (2014, p. 58) mention in their section on credit hours that they only collect data on seven categories, and omit courses outside of economics, Calculus, and Statistics.

Additionally, neither Siegfried and Wilkinson (1982) nor Petkus et al. (2014) do specify how they defined or counted the individual course requirements they collected data on. To compensate for the range of possibilities, in data collection and analysis this study distinguishes between "explicit" and "alternative" course requirements. The way the "Curricula Analyzer" software created for this study works, a confirmed "economic core requirement" may be recorded as either "explicit" or "alternative" via a check box (Figure 2).

This means that when an economic core requirement is explicitly listed (defined per course later) under an economics major program's requirements, the corresponding box under the explicit column is checked. A strict interpretation of the fulfilment or lack of a course requirement allows for a strict lower bound estimate of course requirements in the analysis.

Similarly, codifying courses as “alternative” will allow for an upper estimate of the fulfilment or lack of a course requirement, which may be easily teased apart from the “explicit” requirements. To be elaborated on shortly, this master’s project will not report on the purely explicit results, saving that portion of analysis for an expanded form of this master’s project aiming towards journal publication. Instead this study will report on the upper bound of fulfilled requirements (upper bound = “explicit” + “alternative”).

An economic core requirement’s “alternative” box is checked when there is a requirement or set of requirements that fulfills the definition/spirit of a core requirement *but* its title is different than the explicit requirement title and the acceptable substitute titles detailed below. Also there are a couple of other conditions under which what may seem “explicit” should be recorded as an “alternative”. This design is both necessary and novel for teasing apart nuances of the economics and other curricula. Attempting to understand and replicate Petkus et al.’s (2014) study makes the need for this study’s design considerations readily apparent.

Petkus et al. (2014) do not specify if they counted economic core requirements as being fulfilled in programs where the course in question is required by the institution’s or department’s requirements, but not the economic major’s stated requirements. Also not addressed by Petkus et al. (2014) was if pre-requisites were counted, and the conditions under which they were counted. In other words, were pre-requisites only counted when they were explicitly stated, or were research assistants were instructed to dig through the requirements of the institution, department, and the pre-requirements of required upper-level economics courses. There are three scenarios. In the first, and perhaps most likely, may have Petkus et al. (2014) instructed their research assistants to only count what amount to “explicit” requirements *based on them being readily apparent* on the webpage(s) with a major’s economic core requirements.

In this first scenario, research assistants may, for example, encounter two general kinds of program requirement webpages. Some webpages only list the requirements of the economics major program, with the major program's economic core (and possibly other) requirements explicitly labeled and listed. If, in such a scenario, researchers found that Foundations I courses were not explicitly listed under the requirements, core or otherwise, for the economics major program, they would not be counted. Other webpages may list the major program, department, and institution requirements all on one page, with some of the economic core requirements only being fulfilled by a department or institutional course requirements; not an economic program's. Under this first scenario, since these were readily visible, these would be counted as being explicitly required, but would not have been had the non-major program requirements not been apparent.

In the second scenario, Petkus et al. (2014) may have instructed research assistants to only count an economic core requirement as having been fulfilled for a major program if the course is explicitly required *only as part of the economic major program's stated requirements*. Thus, if there was a webpage on which all requirements of the institution, department, and economic major program were listed, and the requirements of the department or institution were the only ones that explicitly fulfilled an economic core requirement, they wouldn't be counted. Pre-requisites would likely also not be counted, unless explicitly listed as part of the economic major program's stated requirements; not simply by being an institution's or department's requirement, and not by simply being required by a required upper level economics course.

In the third and least likely scenario, Petkus et al. (2014) may have instructed students to go beyond identifying the economic major program's stated course requirements and dig through the various webpages and institution literature (i.e. catalogues) for all such requirements.

Pursuing the first scenario, this study instructs its research assistants to be thorough and persistent in their pursuit of clarifying what economic core requirements are fulfilled, including encountered non-major program courses that fulfil a core requirement as “alternative”.

Additionally, it was not clear if Petkus et al. (2014) included Honors programs as individual economic major programs. This matters because if and how one includes Honors programs, figures can be inflated or deflated relative to Petkus et al.’s (2014) data. As it is not mentioned in their study, this author does not believe Petkus et al. (2014) included such tracks, at least with any meaningful consistency. Thus, this master’s project, and likely the final study, will not include Honors programs in its analysis, although some are recorded, and more will be collected when all of the data entries by research assistants are more thoroughly checked and updated by this author.

However, it is worth reviewing the challenges posed by the presence and integration of Honors programs. On the one hand, Petkus et al.’s (2014) definition would likely include some Honors programs, as economics majors can indeed explicitly offer a specific and singular major programs with “honors” in the title. On the other hand, counting Honors programs is not a consistent venture. The challenge is distinguishing when “honors” is offered as an economics major program, and when it is simply a title or program offered by the department or institution or simply an award for a high GPA without additional course requirements. In this author’s opinion, the latter two scenarios should not be counted as economic major programs.

As stated, sometimes honors is explicitly in the title of a specific economics major program, but most of the time, honors is something that may be tacked on to each distinct economics major program, provided students fulfill additional requirements. Under Petkus et al.’s (2014)

definition, each combination of honors and an initially counted major program should also be counted, regardless of whether attaining honors requires additional courses or only a certain GPA. This can effectively double the number of economics major programs reported at an institution, with each major program identified having an honors counterpart. Petkus et al. (2014) report an average of two economics major programs per institution, and as most institutions offer at least two major programs without counting honors, honors is likely excluded from their data.

This author does not believe the attainment of honors as part of an economics major program should result in additional major programs being counted if attaining honors is solely the result of a student's GPA. However, if the honors designation is not of the institution or department but is rather related to available economics major programs, and if attaining honors requires at least one course not required of a given economics major program, then honors is its own program. Either as part of the publishable version of this master's project or as part of future studies, analyses of economics curricula content may be given additional high and low bound estimates, as given by the inclusion of Honors programs (high) and exclusion of Honors programs (low – this study). Thus, all Honors programs are excluded from this study's analysis and results, in part for simplicity of comparison to previous studies, and in part to ensure relative accuracy and reliability of data gathered, as honors was a complex variable for research assistants.

The being said the following eight courses are the economic core requirements that this study collects data on:

1. Intro to Macro - Macroeconomics is defined by a focus on the big picture; "the economy as a whole" (Mankiw, 2013, pp. 604). Siegfried et al. (1991b) defines "introduction to" or, "principles of macroeconomics", as, "the study of aggregate income, employment, and price

phenomena” (p. 202). In other words, macroeconomics focuses on large combinations of economic systems and factors, including trade, finance, capital, employment labor, and prices, particularly at national and global levels.

- a. Explicit – Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements; Not if it is required as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).
 - i. Principles of Macroeconomics
 - ii. Foundations of Macroeconomics
 - iii. Introduction to Macroeconomics
 - iv. Intro to Macroeconomics
 - v. Essentials of Macroeconomics
- b. Alternative - Check box if
 - i. The economics program requires a course that fulfills the spirit of the “Intro to Macro” requirement but does not use one of the explicit titles above.
 - ii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”

- c. Uncheck all boxes for “Intro to Macro” if
 - i. students required to choose *between* an explicit “Intro to Macro” title and an explicit “Intro to Micro” title
 - 1. Note: because no requirement to take “Intro to Macro” specifically, students can avoid taking it, and thus we do not count it at all.
 - 2. BUT do write a note in the note box stating “choice between Intros”
 - ii. students required to choose between “Intro to Macro” and one or more other courses that do not fulfill the requirement
 - iii. No requirement, in name or spirit, that fulfills the “Intro to Macro” requirements
 - d. Do NOT double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
2. Intro to Micro - Microeconomics is defined by a focus on, “the study of individual markets and decision makers” (Mankiw, 2013, p. 604). Siegfried et al. (1991b) defines introduction to or Principles of, “microeconomics”, as, “the study of individual firm, worker, and consumer behavior” (p. 202). Put one more way, “[t]he study of individual choices and the study of group behavior in individual markets both fall under the rubric of microeconomics” (Frank, 2015, p. 20).
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles AS PART OF the economics requirements. BUT Not if it is required

as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).

- i. Principles of Microeconomics
- ii. Foundations of Microeconomics
- iii. Introduction to Microeconomics
- iv. Intro to Microeconomics
- v. Essentials of Microeconomics

b. Alternative - Check box if

- i. The economics program requires a course that fulfills the spirit of the “Intro to Micro” requirement but does not use one of the explicit titles above.
- ii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”

c. Uncheck all boxes for “Intro to Micro” if

- i. students required to choose *between* an explicit “Intro to Micro” title and an explicit “Intro to Micro” title
 - 1. Note: because no requirement to take “Intro to Macro” specifically, students can avoid taking it, and thus we do not count it at all.
 - 2. BUT do write a note in the note box stating “choice between Intros”

- ii. students required to choose between “Intro to Micro” and one or more other courses that do not fulfill the requirement
 - iii. No requirement, in name or spirit, that fulfills the “Intro to Micro” requirements
 - d. Do NOT double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
3. All-in-One Intro Micro-Macro - Check box if instead of, or in addition to one or both of, the “Intro to Micro” and “Intro to Macro” requirements, a course is required that introduces/handles *both* microeconomics and macroeconomics *in one individual* Introductory/Foundations/Principles course.
4. Intermediate Macro - Builds on “Intro to Macro”, with a focus on how macroeconomic, “theory and real world events interact to produce new knowledge, concepts, and theories about the economy and how it works” (Siegfried et al., 1991b, p. 203). Its course level or number is almost always the 200(0) level or above.
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements. Not if it is required as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).
 - i. Intermediate Macroeconomics
 - ii. Intermediate Macro

- iii. Intermediate Macroeconomic Theory
- iv. Macroeconomic Theory
- v. Advanced [insert one of the above titles]

b. Alternative - Check box if

- i. The economics program requires at least one course that fulfills the spirit of the “Intermediate Macro” requirement but does not use one of the explicit titles above.
 - 1. When there is a requirement to choose between several courses that may fulfill the spirit of the “Intermediate Macro” requirement, make sure that all of the choices fulfill the spirit of “Intermediate Macro”.
 - a. If Not, then Uncheck
- ii. Students choose between an explicit title and equivalent courses
 - 1. When there is a requirement to choose between an explicit title and others, make sure that all of the choices fulfill the spirit of “Intermediate Micro”.
 - a. If Not, then Uncheck
- iii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”

- c. Uncheck all boxes for “Intermediate Macro” if
 - i. students required to choose *between* an explicit “Intermediate Micro” title and an explicit “Intermediate Macro” title
 - 1. Note: because no requirement to take “Intermediate Macro” specifically, students can avoid taking it, and thus we do not count it at all.
 - 2. But do write a note in the note box stating “choice between Intermediates”
 - ii. students required to choose between “Intermediate Macro” and one or more other courses that do not fulfill the requirement
 - iii. No requirement, in name or spirit, that fulfills the “Intermediate Macro” requirements
 - d. Do not double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
5. Intermediate Micro - Builds on “Intro to Micro”, with a focus on how microeconomic, “theory and real world events interact to produce new knowledge, concepts, and theories about the economy and how it works” (Siegfried et al., 1991b, p. 203). Its course level or number is almost always the 200(0) level or above.
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements. Not if it is required as part of

general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).

- i. Intermediate Microeconomics
 - ii. Intermediate Micro
 - iii. Intermediate Microeconomic Theory
 - iv. Microeconomic Theory
 - v. Advanced [insert one of the above titles]
- b. Alternative - Check box if
- i. The economics program requires at least one course that fulfills the spirit of the “Intermediate Micro” requirement but does not use one of the explicit titles above.
 1. Examples:
 - a. Labor Economics
 - b. Home Economics
 - c. Managerial Economics
 - d. Price Theory
 - e. Urban Economics
 - f. Public Economics
 - g. Behavioral Economics
 - h. Consumer Economics
 2. When there is a requirement to choose between several courses that may fulfill the spirit of the “Intermediate Micro” requirement, make sure that all of the choices fulfill the spirit of “Intermediate Micro”.

- a. If Not, then Uncheck
- ii. Students choose between an explicit title and equivalent courses
 - 1. When there is a requirement to choose between an explicit title and others, make sure that all of the choices fulfill the spirit of “Intermediate Micro”.
 - a. If Not, then Uncheck
- iii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”
- c. Uncheck all boxes for “Intermediate Micro” if
 - i. students required to choose *between* an explicit “Intermediate Micro” title and an explicit “Intermediate Macro” title
 - 1. Note: because no requirement to take “Intermediate Macro” specifically, students can avoid taking it, and thus we do not count it at all.
 - 2. But do write a note in the note box stating “choice between Intermediates”
 - ii. students required to choose between “Intermediate Micro” and one or more other courses that do not fulfill the requirement

- iii. No requirement, in name or spirit, that fulfills the “Intermediate Micro” requirements
 - d. Do not double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
6. Econometrics - A blend of math, particularly statistics and calculus, combined with economic models, methods, and theories, for the purpose of qualifying, quantifying, empirically testing, and applying economic data and concepts.
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements. Not if it is required as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).
 - i. Econometrics
 - ii. Intro to Econometrics
 - iii. Senior Seminar in Econometrics
 - iv. Advanced [insert one of the above titles]
 - v. Anything else with the word “Econometrics” in the title
 - b. Alternative - Check box if
 - i. The economics program requires at least one course that fulfills the spirit of the “Econometrics” requirement but does not use one of the explicit titles above.

1. When there is a requirement to choose between several courses that may fulfill the spirit of the “Econometrics” requirement, make sure that all of the choices fulfill the spirit of “Econometrics”.
 - a. If Not, then Uncheck
2. Examples:
 - a. Economic Statistics
 - b. Quantitative Methods in Economics
 - c. Applied Economics & Statistics
 - d. Quantitative Tools in Economics
 - e. Economic Analysis
 - f. Microeconometrics
 - g. Macroeconometrics
3. Important Notes: Sometimes
 - a. A program will require something that could fulfill either the “Alternative Econometrics” or the “Alternative Statistics” requirement.
 - i. If there are no other requirements that fulfill either the “Alternative Econometrics” or the “Alternative Statistics” requirement, then make a judgement call as to which requirement it fulfills. Write note if you feel like you should.
 - ii. If there is one or more other courses that fulfill the “Alternative Econometrics” or the “Alternative

Statistics” requirement, then use that to inform your decision.

- b. The first program encountered at an institution will require students take something like “Economic Statistics” but not anything else that qualifies as “Alternative Econometrics”, “Statistics”, or the “Alternative Statistics” requirement. I would count this as fulfilling an “Alternative Econometrics” course but not a “Statistics” or “Alternative Statistics” requirement; had it been “Business Statistics” it would have been counted as “Statistics”, and had it been “Quantitative Methods” it would have been “alternative Statistics” unless its description said it focused on economics. The second program required students take “business statistics” and then choose either “Economic Statistics” or “Quantitative Methods in Economics”, so I counted the program as fulfilling both “Alternative Econometrics” and “Statistics” requirement. The third program required students take “Intro to Econometrics” and “Economic Statistics”, so I checked “Econometrics” and “Statistics”.
- ii. Students choose between an explicit title and equivalent courses
 1. When there is a requirement to choose between an explicit title and others, make sure that all of the choices fulfill the spirit of “Econometrics”.
 - a. If Not, then Uncheck

- iii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”
 - c. Uncheck all boxes for “Econometrics” if
 - i. students required to choose between “Econometrics” and one or more other courses that do not fulfill the requirement
 - ii. No requirement, in name or spirit, that fulfills the “Econometrics” requirements
 - d. Do not double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
7. Statistics - See definitions under “Explicit” and “Alternative”
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements. Not if it is required as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).
 - i. Anything with the word “Statistics” in the title

b. Alternative - Check box if

- i. The economics program requires at least one course that fulfills the spirit of the “Statistics” requirement but does not use one of the explicit titles above.

1. i.e. course focuses on statistics in the course description.
2. When there is a requirement to choose between several courses that may fulfill the spirit of the “Statistics” requirement, make sure that all of the choices fulfill the spirit of “Statistics”.

a. If Not, then Uncheck

- ii. Students choose between an explicit title and equivalent courses

1. When there is a requirement to choose between an explicit title and others, make sure that all of the choices fulfill the spirit of “Statistics”.

a. If Not, then Uncheck

- iii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.

1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”

- iv. Important Notes: Sometimes

1. A program will require something that could fulfill either the “Alternative Econometrics” or the “Alternative Statistics” requirement.

- a. If there are no other requirements that fulfill either the “Alternative Econometrics” or the “Alternative Statistics” requirement, then make a judgement call as to which it requirement it fulfills. Write note if you feel like you should.
- b. If there is one or more other courses that fulfill the “Alternative Econometrics” or the “Alternative Statistics” requirement, then use that to inform your decision.
- c. The first program encountered at an institution will require students take something like “Economic Statistics” but not anything else that qualifies as “Alternative Econometrics”, “Statistics”, or the “Alternative Statistics” requirement. I would count this as fulfilling an “Alternative Econometrics” course but not a “Statistics” or “Alternative Statistics” requirement; had it been “Business Statistics” it would have been counted as “Statistics”, and had it been “Quantitative Methods” it would have been “alternative Statistics” unless its description said it focused on economics. The second program required students take “business statistics” and then choose either “Economic Statistics” or “Quantitative Methods in Economics”, so I counted the program as fulfilling both “Alternative Econometrics” and “Statistics” requirement. The third program required students take “Intro to Econometrics” and “Economic Statistics”, so I checked “Econometrics” and “Statistics”.

- c. Uncheck all boxes for “Statistics” if
 - i. students required to choose between “Statistics” and one or more other courses that do not fulfill the requirement
 - ii. No requirement, in name or spirit, that fulfills the “Statistics” requirements
 - d. Do not double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.
8. Calculus - See definitions under “Explicit” and “Alternative”
- a. Explicit - Check box if the program explicitly requires a course with one of the following titles as part of the economics requirements. Not if it is required as part of general education or “college” requirements (i.e. business college core requirements), in which case you will check “alternative” (see below).
 - i. Anything with the word “Calculus” in the title
 - b. Alternative - Check box if
 - i. The economics program requires at least one course that fulfills the spirit of the “Calculus” requirement but does not use one of the explicit titles above.
 - 1. i.e. course focuses on calculus in the course description.
 - 2. When there is a requirement to choose between several courses that may fulfill the spirit of the “Statistics” requirement, make sure that all of the choices fulfill the spirit of “Calculus”.
 - a. If Not, then Uncheck

- ii. Students choose between an explicit title and equivalent courses
 - 1. When there is a requirement to choose between an explicit title and others, make sure that all of the choices fulfill the spirit of “Calculus”.
 - a. If Not, then Uncheck
- iii. An explicit title, or a course that fulfills its spirit, is required by general education or “college” requirements (i.e. business college core) instead of the requirements for the economics major itself.
 - 1. Note: do not go digging for general education or college requirements, but if they are on the same page as the economics major requirements, or encountered along the way, then check “Alternative”
- c. Uncheck all boxes for “Calculus” if
 - i. students required to choose between “Calculus” and one or more other courses that do not fulfill the requirement
 - ii. No requirement, in name or spirit, that fulfills the “Calculus” requirements
- d. Do not double count a core course requirement for a given major program, or check more than one box per core requirement (check either “explicit” or “alternative”, not both) even if other courses exist fulfilling one or both.

The results concerning economic core requirements as a function of institution type may be seen in Table 11, and will be compared to Petkus et al.’s (2014) equivalent data in Table 1. Table 12 further breaks down data concerning the requirements of introductory economics courses, for comparison to aspects of Petkus et al.’s (2014) analysis of the introductory courses (see Table 2). Table 13 displays the first institution rank analyses of all Foundations courses by all four *U.S. News and World Report* institution types. The rank analyses relating Table 13 are

based on, and in the findings compared to, Petkus et al.'s (2014) initial rank analyses of Top 50 and Remaining National Universities' and National Liberal Arts Colleges' Econometrics and Calculus requirements (see Table 3). Table 14 estimates the distribution of the number of credit hours of economic core requirements required by institution type, as per Petkus et al.'s (2014) methods of estimation and display (See Table 5).

Special requirements. These variables are the same as, and thus comparable to, Siegfried and Wilkinson's (1982) data on the "frequency of special requirements for economics major (percent requiring)" (p. 132) (see Table 4), with two exceptions. The first is that this study will analyze the "special requirements" via the *U.S. News and World Report* institution types, which differ slightly from Siegfried and Wilkinson's (1982) institution types, but are comparable (Petkus et al., 2014). The second is that this study splits Siegfried and Wilkinson's (1982) variable "independent study course or project" (p. 132), into "independent study" and "capstone". The following variables and definitions were used by this study to collect data comparable to Siegfried and Wilkinson's (1982) "special requirements" (p. 131-132), with the results viewable in Table 15 in the following order.

1. Comprehensive Exam Required - Check box if student are required to take a "Comprehensive Exam" or an equivalent (an exam taken senior year that covers what student learned throughout the program).
2. Independent Study - Check box if students are explicitly required to complete an "Independent study" as part of the economics major requirements.
3. Capstone Required - Check box if students are explicitly required to complete a "Capstone" OR "Senior Project" as part of the economics major requirements.

4. Senior Thesis Required - Check box if students are explicitly required to complete a “Thesis” as part of the economics major requirements.
5. Distributional Requirements [among subfields of economics] - Check box if *within* a major program students must choose at least one course from two or more *explicit* subfields of economics (remember that each track, specialization, emphasis, etc. is its own major program, so requirements must be within a given track etc.).
 - a. For example the major “B.S. Economics – International Trade Track” may require that students take four courses (often electives), with one course being from each of the listed subfields of economics. The courses students are to choose from are then listed by subfields of economics. Subfields include:
 - General Economics and Teaching
 - History of Economic Thought,
Methodology, and Heterodox Approaches
 - Mathematical and Quantitative Methods
 - Microeconomics
 - Macroeconomics and Monetary Economics
 - International Economics
 - Financial Economics
 - Public Economics
 - Health, Education, and Welfare
 - Labor and Demographic Economics
 - Law and Economics
 - Industrial Organization

- Business Administration and Business Economics;
Marketing; Accounting
- Personnel Economics
- Economic History
- Economic Development, Innovation, Technological
Change, and Growth
- Economic Systems
- Agricultural and Natural Resource Economics;
Environmental and Ecological
- Economics
- Urban, Rural, Regional, Real Estate, and
Transportation Economics

6. Specialization Requirement within a Sub-field - Check box if students are required to take a certain number of courses *within* a specific subfield of economics as part of an economics major program (remember that each track, specialization, emphasis, etc. is its own major program, so requirements must be within a given track etc.).

- a. For example the major “B.S. Economics – International Trade Track” may require that students take or choose a specific set of courses under one specific subfield of economics that is listed in the requirements. Students may sometimes choose which specific subfield they desire to specialize in BUT make sure it is not simply a track or concentration (etc.) and thus its own major program (this can be hard to distinguish, so make note and check “data pending” if uncertain). Subfields include:

- General Economics and Teaching

- History of Economic Thought, Methodology, and Heterodox Approaches
- Mathematical and Quantitative Methods
- Microeconomics
- Macroeconomics and Monetary Economics
- International Economics
- Financial Economics
- Public Economics
- Health, Education, and Welfare
- Labor and Demographic Economics
- Law and Economics
- Industrial Organization
- Business Administration and Business Economics; Marketing; Accounting
- Personnel Economics
- Economic History
- Economic Development, Innovation, Technological Change, and Growth
- Economic Systems
- Agricultural and Natural Resource Economics; Environmental and Ecological
- Economics

- Urban, Rural, Regional, Real Estate, and
Transportation Economics

7. Senior Seminar Required - Check box if students are required to take a senior “Seminar”, “Lecture”, “Symposium”, or 400(0) level class, whether on its own or as required by or as part of another special requirement (its ok to double dip if both are explicit).
8. Internship Required - Check box if students are required to take an “Internship”, a “Co-Op”, or pursue work in a job relevant to their major while still enrolled.

General questions. This immediate study is concerned with three orders of questions. The primary questions seek to answer, to what extent are the Foundations courses from Siegfried et al.’s (1991a; 1991b) ideal economic core requirements for undergraduate economics majors, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics), required by undergraduate economics major programs in the U.S.? The secondary questions examine, to what extent are the courses Siegfried and Wilkinson (1982) call, “special requirements for the economics major” (p. 131-132) required by undergraduate economics major programs in the U.S.? Tertiary questions concern what amounts to miscellaneous variables that may be convenient to report on in this study if time permits. Each of these broad questions has numerous operationalized sub questions and accompanying hypotheses, dealt with shortly.

General hypotheses. This study has three general hypotheses. First, compared to Petkus et al.’s (2014) analysis of data from 2010 on the U.S. undergraduate economics curricula, it is hypothesized that all institution types will have increased the degree to which they require Foundations courses. Second, it is hypothesized that Petkus et al.’s (2014, p. 58) findings, that

average course requirements of major programs within the Top 50 institutions of a given type will differ from those of the lower institutions, will hold, with the Top 50 generally requiring more. Third, in regards to Siegfried and Wilkinson's (1982) "special requirements" (p. 131-132), it is hypothesized that the percent of institutions requiring special requirements will have generally increased, with some special requirements being found to have increased more than others.

Findings

Having defined the variables this study is concerned with, and having stated the general questions and hypotheses to be explored, this section presents the findings and compares them to previous studies via operationalized questions and hypotheses. First this section will give an overview of the key assumptions guiding this study's data collection, analyses, and findings. Then the findings concerning population characteristics of institutions and economics programs will be described in relation to Petkus et al.'s (2014) population data, and the *2017 U.S. News and World Report's* (2016) population data (see Table 16). Finally, this section will then begin exploring the findings via by three orders of questions, created before data collection was complete, for the purpose of guiding analyses. Each broad question is operationalized by being broken down into specific sub-questions and hypotheses, defining the parameters of data reporting and analyses.

As discussed, Petkus et al.'s (2014) study did not give specify a number of methodological and procedural factors. To compensate, this study's research design utilizes novel processes of data collection and analyses that allow for a range of definitions and assumptions to be captured and portrayed. Several possible research designs that Petkus et al.

(2014) may have utilized were posited, and one was deemed likely before data collection began. In master's project form, this study's procedures, analyses, questions, hypotheses, and thus findings, reflect these considerations and resulting assumptions.

Specifically, for reasons already discussed, it was assumed that Petkus et al. (2014) instructed research assistants to count all courses fulfilling a Foundations requirement, provided that they are readily visible on the webpage where a major program's requirements are found. Put another way, it was assumed that Petkus et al.'s (2014) research assistants were instructed not to go out of their way digging for requirements that fulfill a Foundations requirement but are not of the economics major's stated requirements, such as external general course requirements. Often the general education requirements of a department, college, or institution can fulfill a Foundations requirement, particularly either explicitly in title or in character of content.

However, such requirements are often listed in different location than the economics major requirements are to be found, and thus requires extra time and effort, sometimes significantly so, to ensure all additional requirements of students at an institution are located. This study is primarily interested in collecting data on the minimal fulfillment of Foundations requirements as required specifically by an economics program, referred to in the procedures as Explicit economic core requirements. However, this study was designed with the understanding that whether to include and how to categorize some required courses can be ambiguous, or for that matter that the Explicit definitions of the procedures can be too strict. To ensure that key or possible data wasn't missed, this study collected data under less strict definitions as Alternative.

Specifically, when an Explicit Foundations course title is required by something other than the economics program, or when a requirement of any origin lacks an Explicit title but

fulfills the spirit of a Foundations course, it is counted as Alternative. Though a couple of unanticipated course titles were identified as needing to be added to the approved Explicit course titles, Explicit course requirements are consistent and easy to replicate, leaving little room for interpretation or error. Alternative course requirements leave a little more license of interpretation to the trained research assistants. Yet the primary factor influencing the degree to which Alternatives are counted and inflate the figures relative to the Explicit fulfilment of the Foundations, is the emphasis placed on identifying requirements outside an economics program.

Both attempting a close comparison of this study's data to Petkus et al.'s (2014) under the aforementioned assumptions, and to balance the needs and scope of this study/master's project, no big effort was made to collect data on requirements not of an economics program. If Alternative requirements, such as the general education requirements of a department, college, or institution, were readily visible as the data on the major's requirements was collected, they were counted. This study's research assistants were instructed not to go out of their way to gather data on requirements that were neither of the economics major's requirements, nor readily visible when identifying the economics major program's requirements.

Thus, in following the assumptions and preparing to compare results to Petkus et al.'s (2014) data, this study's reported findings are an aggregate of the strict (Explicit) and looser (Alternative) fulfilment of Foundations requirements. Yet, as Alternative is not as expansively applied as it could be (i.e representing all requirements outside a given major program, even when not easily visible), it does not offer as high of an upper bound estimate as it could. In other words, data on Explicit requirements can be understood as a fairly consistent lower limit of the minimal fulfilment of Foundations requirements by economics majors. However, the true upper

limit for the minimal satisfaction of Foundations requirements is established by including even the most obscure instances of Alternative requirements, and aggregating them with the Explicit.

On the topic of methods imposed bounds, it was assumed that Petkus et al. (2014) instructed research assistants not include Honors programs as economics major programs. While this study did count Honors programs, this study's presented findings omit Honors programs in order to match the assumptions posited to attempt a direct comparison to Petkus et al. (2014).

The last assumption the hypotheses are based on is that the ideal economics curricula that Siegfried et al. (1991a; 1991b) and Siegfried (2012) outline, have indeed been broadly accepted as the standard, and thus will generally increase in practice over time. Thus, most of this study's hypotheses concerning the Foundations requirements predict an increase for each requirement. This assumption and accompanying hypotheses are also informed by Petkus et al. (2014) generally finding an increase in minimal fulfilment of Foundations requirements since Siegfried and Wilkinson (1982), with this study presuming to find this trend generally continued.

Finally, a key finding to understand before proceeding is that this study's procedures and data indicate that some of the aforementioned assumptions concerning Petkus et al.'s (2014) methods were incorrect. There are consistent patterns in the differences between this study's findings and Petkus et al.'s (2014) that seem to prove that Petkus et al. (2014) instructed their research assistants to hunt down and identify *all* economics, Statistics, and Calculus requirements. That is, Petkus et al.'s (2014) research assistants were likely instructed to dig for, identify, and count as data all instances of economics, Statistics, and Calculus requirements, regardless of whether required by the economics major specifically, or by a department, college, or institution.

Similarly, it would appear the assumption that Petkus et al.'s (2014) data did not include Honors programs may also have been wrong. This assumption is not as clearly incorrect, as this study only identified, and then omitted from this study's findings, 26 Honors programs, many of which were in Top 50 institutions. However, if there was a variable that may have been difficult for research assistants to identify, causing errors, it would have been identifying Honors programs. This, and the fact that Petkus et al. (2014) report a much higher percent of individual institutions offering more than four major programs than this study found, suggests that Petkus et al. (2014) likely included Honors programs, and likely identified or found more than this study. This leaves the question of whether there was a real reduction in the number of economics major programs relative to Petkus et al.'s (2014) methods and findings, or if there was some degree of pruning. Either way, the intended follow up studies will round out this study's preliminary process and findings.

In sum, this study's preliminary findings closely reflect the presence economics majors in institutions listed by the *2017 U.S. News and World Report* (2016), and each identified program's own stated requirements that may minimally fulfill a Foundations requirement (Siegfried et al., 1991a; 1991b). The lack, or degree, of support for the operationalized hypotheses based on comparisons to Petkus et al.'s (2014) study seem primarily attributable to the aforementioned assumptions, and resulting differences in method. However, this study's findings are of significance on their own, in spite of their preliminary nature.

As the data and findings reported in this draft of this study are preliminary, the data cannot be said to be error free. However, due to the methods employed and preliminary findings, errors are presumed to have a fairly small impact on the findings, particularly in comparison to the differences in methods described above. In this context, this study's findings will be used to

upgrade the methods and processes of this study, which will then be applied as the data is all checked for accuracy under these revisions, preparing the methods and data for the upcoming studies of Phase One,.

Population

Population of institutions. Comparing the *2017 U.S. News and World Report* (2016) with the *2010 U.S. News and World Report* (2009) institution populations, there are some slight shifts in numbers (see Table 16). Though the number of closed, merged, reclassified, or newly opened or counted institutions is not known, in terms of total population size, there are 117 more institutions in the *2017 U.S. News and world Report* (2016) rankings than in the *2010 U.S. News and world Report* (2009) rankings. It seems likely that changes reflect real openings, closings, or mergers of institutions, or their addition to the *U.S. News and World Report* rankings, as opposed to any serious shifts in their classifications of institution type (Indiana University, n.d.; Morse, 2009; Morse et al. 2017; see Table 7, Table 8, Table 9, Table 10, and Table 16).

The *Carnegie Classifications* (Indiana University, n.d.) are used extensively by education researchers, including the U.S. Department of Education, was updated every five years between 2000 and 2018, and has now shifted to three year update intervals (Morse, 2009; Morse et al., 2017). The classifications are largely used to organize data concerning educational institutions and to determine an institution's eligibility for grants (Indiana University, n.d.; Morse, 2009; Morse et al., 2017). The *2010 U.S. News and World Report* (2009) rankings utilize the *2005 Carnegie Classifications* (2006) (see Table 7 and Table 9), and the *2017 U.S. News and World Report* (2016) uses the *2015 Carnegie Classifications* (2016) (see Table 8 and Table 10).

The definitions of the *2005 Carnegie Classifications* (2006) seem to differ little from the *2015 Carnegie Classifications* (2016). Likewise, the *2010 U.S. News and world Report* (2009) and *2017 U.S. News and world Report* (2016) category definitions seem to have only changed classification headings, as opposed to having made any changes in the groupings of the *Carnegie Classifications* (Indiana Univierity, n.d.; Morse, 2009; Morse et al., 2017). Additionally, Morse et al. (2017) state that the *2018 U.S. News and world Report* (2017) rankings also use the *2015 Carnegie Classifications* (Carnegie Foundation, 2016), and that, “[c]onsequently, only handful of schools changed categories” since the *2017 U.S. News and world Report* (2016) rankings; Table 16 includes the *2018 U.S. News and world Report* population data as an additional reference point.

It thus seems likely that the updates mostly deal with integrating previously unclassified institutions, and reassessing existing institutions. It also seems that unlikely that a large number of institutions were reclassified, particularly to such an extent the relevant shift in Carnegie Classification would translate into a *U.S. News and World Report* category change. Thus, it is assumed that the overall population shifts reflect mostly real additions and subtractions of institutions taking place almost exclusively within a *U.S. News and World Report* category. The research design and software application of this study will be able to track increasingly specific shifts in such factors as the multiphase research design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008) progresses.

Comparing the overall population of institutions from the *2010 U.S. News and World Report* to those of the *2017 U.S. News and World Report*, this study’s initial findings indicate a total net gain of 117 institutions (see Table 16). Within institution types, “National Universities” had a net gain of 48 institutions, “Regional Universities” had a net gain of 81 institutions, and

“Regional Colleges” had a net gain of 15 institutions. “National Liberal Arts Colleges” was the only institution type with a net loss, having decreased by 27 institutions.

Institutions offering economics majors. Perhaps reflecting the modest increase in the number of institutions from the *2010 U.S. News and world Report* (2009) to the *2017 U.S. News and world Report* (2016), this study found a net gain of 12 in total number of institutions offering at least one economics major program, as compared to Petkus et al.’s (2014) findings. In percent terms, of all institutions in the *2010 U.S. News and World Report* Petkus et al. (2014) found that, “[f]orty-five percent of schools do not offer an economics major” (p. 57). This study found that 47.7% of institutions did not offer an economics major.

The denominator (total institutions of the *U.S. News and World Report*) growing by more than the numerator (number of institutions offering at least one economics major program), may explain most of the difference. The slight increase in the proportion of institutions not offering an economic major may also indicate that institutions added to the *U.S. News and World Report* since the *2010 U.S. News and world Report* (2009) rankings are less likely to feature an economics major program. Within institution types, additional nuances emerge.

Comparing Petkus et al.’s (2014; see Table 1) data with this study’s (see Table 11 and Table 16), National Universities saw a net gain of 17 institutions offering an economics major. In contrast, “Regional Universities” only saw a net gain of three institutions offering an economics major, “National Liberal Arts Colleges” saw a net loss of three institutions offering a major, and “Regional Colleges” saw a net loss of five. As with the other findings of this master’s project, these may slightly change as result of pending quality control processes.

Population of economics majors. Since Petkus et al.'s (2014) study, across institution types, there has been a notable decline in both the number of economic major programs, and the average number of programs offered by an institution. Comparing the total number of economics major programs offered by institutions in the *2010 U.S. News and World Report* (2009) to the total number of economics major programs offered by the institutions in the *2017 U.S. News and World Report* (2016), this study's initial findings indicate a net loss of 212 economics major programs. This stands in contrast with the net gain of 117 institutions overall, and the net gain of 12 institutions offering at least one economics major program (see Table 1, Table 11, and Table 16). It seems unlikely that either the possibility of missed Honors programs, or the omission of the 26 identified Honors programs from this study's reported findings, would cause such a large difference.

Since Petkus et al.'s (2014) study, National Universities had a net gain of 48 institutions, and a net gain of 12 institutions offering at least one economics major program, the category saw a net loss of 51 major programs being offered. Regional Universities saw a net gain of 81 institutions, and a net gain of three institutions offering at least one economics major program, but saw a net loss of 144 economics major programs being offered. National Liberal Arts Colleges saw a net loss of 27 institutions, a net loss of three institutions offering at least one economics major program, and saw a net loss of six economics major programs being offered. Regional Colleges saw a net gain of 15 institutions, a net loss of five institutions offering at least one economics major program, and a net loss of six economics major programs being offered.

Examining the average number of economics major programs offered by an institution, as a whole and within each institution, there is a decline relative to Petkus et al.'s (2014) data (see Table 1 and Table 11). As a whole, this study found that the average number of economics major

programs offered by an institution decreased slightly, from an average of 2 programs per institution in Petkus et al.'s (2014) findings, to 1.73 per institution in this study's findings. Additionally, Petkus et al. (2014) found that five percent of institutions offered four or more economics major programs, compared with this study's finding 0.07 percent of institutions offered four or more.

In the context of the relatively slight changes in both the total number of institutions offering an economics major program and the total number of institutions, the decrease in the total and average number of major programs per institution may be indicative of several factors. First of all, it was assumed that Petkus et al. (2014) did not have their research assistants count Honors programs, as they can be challenging to consistently locate and identify as part of an economics major program and not of a department or institution. Thus, this study's findings reflect an omission of Honors programs. The large decline percent of institutions offering four or more economics major programs may indicate that it was incorrect to assume Petkus et al. (2014) did not include Honors programs. However, this study's initial findings show that including Honors programs only adds 26 programs to the total number of programs offered by institutions.

This net gain of 26 economics programs from the inclusion of Honors programs is fairly evenly distributed among institution types, though Regional Colleges saw no gains. While the differences in the number of economic major programs offered by institution type do thin out slightly, only National Liberal Arts Colleges saw a net loss, of six programs, turn into a net gain, of four programs, relative to Petkus et al. (2014). This brings us to the next factor that may contribute to fluctuations in data and consequentially the outcomes of this study's hypotheses.

As mentioned, is the need to update methods in accordance with the lessons learned in this master's project, and then to apply the updated methods as part of the complete review of collected data for quality control purposes. This may be able to partially explain small deviations in the number of programs this study identified. In the process of quality control, it is likely that a few additional economics major programs will be identified and added, and Honors programs may indeed turn out to compose many or most of the new additions. However, how significant of a difference they shall really make remains to be seen.

If errors in method or data collection were a major factor in identifying major programs, it likely would impact hypotheses concerning National Liberal Arts Colleges, and particularly Regional Colleges, most, as their n 's and differences from previous studies are relatively smaller. However, assuming no large errors in data collection, the size of reductions in the number of programs offered by National Universities and Regional Universities, relative to the small gains in institutions offering a major, implies an actual decrease in the number of programs offered.

Thus, there are at least two other factors that may be contributing to differences between this study's data on the number of economics programs offered, and Petkus et al.'s (2014) findings. One is that some institutions may favor balancing, merging, or exchanging economics major programs with business programs, particularly those with an economics concentration. Additionally, as there are economic and pedagogical concerns that schools are offering too many varieties of economics major programs, there is a chance that the lower average reflects an effort to refine or reduce the number of programs. Again, a quality control process must be undergone before the presence and characteristics of the possible decline in the number of economics major programs can be confirmed.

Table 16

U.S. News and World Report Population Characteristics of Institutions for 2010, 2017, and 2018

	Total	National Universities	Regional Universities ^a	National Liberal Arts Colleges	Regional Colleges ^b
<i>All U.S. News Institutions by year</i>					
<i>2010</i>	1,419	262	572	266	319
<i>2017</i>	1,536	310	653	239	334
<i>2018</i>	1,527	311	659	233	324
<i>U.S. News institutions with at least one economic major program by year</i>					
<i>2010</i>	792	237	317	185	53
<i>2017</i>	804	254	320	182	48

Note. Data from Morse (2009), Morse et al. (2017), Petkus et al. (2014), and this study.

^a 2010 U.S. News called "Universities-Master's"

^b 2010 U.S. News called "Baccalaureate Colleges"

Primary questions

To what extent are the Foundations courses from Siegfried et al.'s (1991a; 1991b) ideal economic curricula for undergraduate economics majors, Foundations I (Intro to Microeconomics and Intro to Macroeconomics), Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics), required by undergraduate economics major programs in the U.S.?

1. How do these requirements vary by institution type in Table 11, and how do these compare to Petkus et al. (2014) (see Table 1)?
 - a. For Siegfried et al.'s (1991a; 1991b) Foundations I, it is hypothesized that
 - i. as a whole, the percent of *all* major programs requiring one or more of Intro to Microeconomics, Intro to Macroeconomics, and an All-in-One Intro Micro-

Macro course, the three being collectively referred to as “Principles of Economics” in Table 1, Table 11, Table 2, and Table 12, will be at or above 99.9%, as found by Petkus et al. (2014, p. 57).

1. Finding: The hypothesis is not supported by this study’s data. This study found that percent of all economics programs requiring at least one Principles course is about 10% less than Petkus et al.’s (2014) percent of total programs requiring a Principles course.

This 10% difference is one of numerous relatively consistent differences between this study’s data and Petkus et al.’s (2014). Dealt with as they present, these differences strongly suggest that Petkus et al. (2014) extensively included requirements not specifically listed by a given economic major program’s stated requirements, in contrast with this study collecting such requirements at convenience, under a less extensive pursuit of what this study deems Alternative requirements.

- ii. *within each* institution type, the percent of major programs requiring one or more of Intro to Microeconomics, Intro to Macroeconomics, and an All-in-One Intro Micro-Macro course, will be at or above 99.8%, the lowest finding within an institution type in Petkus et al.’s (2014) study (for National Universities).

1. Finding: For each institution type, the hypothesis is not supported by this study’s data. With one exception, within each institution type, this study found that percent of all economics programs requiring at least

one Principles course is about 10% less than each of Petkus et al.'s (2014) findings on Principles by institution type.

With this study finding about 90% of major programs within each institution type to require a Principles course, at 82.46% Regional Colleges are the clear outlier in terms of the percent of their major programs of requiring at least one Principles course. This smaller percent is likely a consequence of the number of Regional Colleges and economics programs offered by them, both being relatively small. Thus smaller differences in data, whether real, of methods, or in error, are amplified compared to such differences within other institution types.

To be addressed in the section concerning the distribution of Principles requirements, careful analysis suggests that the small numbers of Regional Colleges and their programs disproportionately represent what are for other institution types very slight potential variations in their Principles data due to differences between this stud's methods and Petkus et al.'s (2014). Specifically, assuming five Principles requirements were missed as a result of differences in methods, 8.7 percent of Regional Colleges could be accounted for, and possibly significantly more, closing the gap with the other institution type's Principles requirements (see Table 2 and Table 12).

Assuming no major errors in data collection, these findings are taken to strongly suggest that Petkus et al. (2014) extensively included

requirements not specifically listed by a given economic major program's stated requirements, in contrast with this study collecting such requirements at convenience, under a less extensive pursuit of what this study deems Alternative requirements. This fact appears to have had the largest impact on this study's data on Regional Colleges.

- b. For Siegfried et al.'s (1991a; 1991b) Foundations II, it is hypothesized that
 - i. As a whole, the percent of *all* major programs requiring Intermediate Microeconomics will be at or above 94.8%, as found by Petkus et al. (2014).
 - 1. Finding: The hypothesis is not supported by this study's data. This study found that percent of all economics programs requiring at least one Intermediate Microeconomics course is about 10% less than Petkus et al.'s (2014) percent of total programs requiring at least one Intermediate Microeconomics course. Like the findings thus far, the 10% difference likely reflects differences in methods between this study and Petkus et al.'s (2014) study, as opposed to errors in data collection.

It is also worth noting that while Petkus et al. (2014) report Intermediate Microeconomics as being required slightly more often in all institution types than Intermediate Macroeconomics, by 0.5 to 1.5 percent (see Table 1). In contrast, this study, which is more representative of a program's own stated requirements, found this to be flipped. Specifically, this study found Intermediate Macroeconomics to be required more often than Intermediate

Microeconomics in all institution types, by 1.75 to 2.76 percent (see Table 11).

- ii. *within each* institution type, the percent of major programs requiring Intermediate Microeconomics will be the same or have increased, as compared to Petkus et al.'s (2014; see Table 1) findings.

1. Finding: The hypothesis is not supported by this study's data. Within each institution type this study found that the percent of economics programs requiring at least one Intermediate Microeconomics course to be about 10% less than Petkus et al.'s (2014) comparable findings for Regional Universities and National Liberal Arts Colleges, and about 15% less than Petkus et al.'s (2014) comparable findings for National Universities and Regional Colleges.

While this study found the Intermediate Microeconomics requirements of economics programs in National Universities to be lower than Petkus et al.'s (2014) by about 15%, this study found the percent of programs in National Universities requiring Intermediate Microeconomics to be roughly level the requirements of programs in Regional Universities and National Liberal Arts Colleges. While reality, methods, and error may attribute to this difference, it is notable that Petkus et al.'s (2014; see Table 1) found 99.3% of economics programs in National Universities to require Intermediate Microeconomics; about six percent more than Petkus et al.'s (2014)

findings for Intermediate Microeconomics requirements of programs in Regional Universities and Liberal Arts Colleges.

Notably, unlike the case with Principles courses where Petkus et al. (2014) found the percent of Regional Colleges requiring a Principles course to be practically the same as the other institution types and this study found the Principles requirements of Regional Colleges to stand out, the percent of economics majors at Regional Colleges requiring Intermediate Microeconomics was an outlier for both this study's and Petkus et al.'s (2014) findings.

This study found that the percent of economics major programs at Regional Colleges that require an Intermediate Microeconomics is about 14% to 20% less than major programs of other institution types in this study. In contrast, Petkus et al.'s (2014) study found that the percent of economics major programs at Regional Colleges that require an Intermediate Microeconomics is about 10% to 17% less than major programs of other institution types.

iii. As a whole, the percent of *all* major programs requiring Intermediate Macroeconomics will be at or above 94.1%, as found by Petkus et al. (2014; see Table 1).

1. Finding: The hypothesis is not supported by this study's data (see Table 11). This study found that percent of all economics programs requiring at least one Intermediate Macroeconomics course is about 10% less than Petkus et al.'s (2014) percent of total programs

requiring at least one Intermediate Macroeconomics course. Like the findings thus far, the 10% difference likely reflects differences in methods between this study and Petkus et al.'s (2014) study, but this study's findings may be considered a somewhat closer representation of what an economics major's stated requirements are.

iv. *within each* institution type, the percent of major programs requiring Intermediate Macroeconomics will be the same or have increased, as compared to Petkus et al.'s (2014) findings.

1. Finding: The hypothesis is not supported by this study's data. Within National Universities, Regional Universities and even Regional Colleges, the percent of economics programs in Table 13 requiring at least one Intermediate Macroeconomics course is generally about 10% less than Petkus et al.'s (2014; see Table 1) comparable findings. With the greatest Intermediate Macroeconomics requirements in this study, Intermediate Macroeconomics requirements of programs in National Liberal Arts Colleges were found in Table 13 to be only about four percent less than Petkus et al.'s (2014; see Table 1) comparable data.

c. For Siegfried et al.'s (1991a; 1991b) Foundations III, it is hypothesized that

i. As a whole, the percent of *all* major programs requiring a Statistics course will be at or above 93.9%, as previously found by Petkus et al. (2014).

1. Finding: The hypothesis is not supported by this study's data, with this study finding that only 13.53% of all economic major programs required some form of Statistics. This seems to be more concrete

evidence of the likely presence and impact of differences between this study's methods and those of Petkus et al.'s (2014) study. Statistics and Calculus courses appear to be most often required by a department or institutions general education requirements, and not by an economics major program's own requirements. As this study purposefully did not extensively collect data outside of an economics major's stated requirements, the strikingly low percentage of economics major programs requiring at least one Statistics course seems more representative of what is actually listed as required by economics major programs themselves.

- ii. *within each* institution type, the percent of major programs requiring a Statistics course will be the same or have increased, as compared to Petkus et al.'s (2014) findings.

- 1. Finding: The hypothesis is not supported by this study's data. Petkus et al.'s (2014) study found that within each institution type, over 90% of economics major programs required Statistics. By contrast, within institution types this study found that at most, 16.9% of economic major programs in National Universities required some form of Statistics, and, at least, 1.75 percent (=one Alternative course) of economics major programs at Regional Colleges required Statistics.

This seem to be more concrete evidence of the likely presence and impact of differences between this study's methods and those of Petkus et al.'s (2014) study. Statistics and Calculus courses appear to

be most often required by a department or institutions general education requirements, and not by an economics major program's own requirements. As this study purposefully did not extensively collect data outside of an economics major's stated requirements, the strikingly low percentage of economics major programs requiring at least one Statistics course seems more representative of what is actually listed as required by economics major programs themselves.

iii. As a whole, the percent of *all* major programs requiring an Econometrics course will be at or above 40.7%, as compared to Petkus et al.'s (2014) previous finding.

1. Finding: This study's findings support this hypothesis, with 50.4% of all economics major programs requiring some form of Econometrics. In contrast with Statistics and Calculus courses, Econometrics courses are typically only required or offered by an economics major program, and are seldom found in an institution or department's general education requirements. Thus, this finding seems to support the notion that this study's data are generally lower than the findings of Petkus et al.'s (2014) study due to differences in methods, as opposed to significant errors.

Additionally, Econometrics is likely the least affected by the differences in methods, as they are most often of economics major program requirements, which were the focus of this study's data

collection. Thus, this finding may indicate a real rise in the tendency of economics major programs to require an Econometrics course.

iv. *within each* institution type, the percent of major programs requiring an Econometrics course will be the same or have increased, as compared to Petkus et al.'s (2014) findings.

1. Finding: This study's data support this hypothesis. Since Petkus et al.'s (2014) study, in terms of the percent of economics programs requiring some form of Econometrics, National Universities saw a net gain of about five percent, Regional Universities saw a net gain of about 13%, National Liberal Arts Universities saw a net gain of about eight percent, and Regional Colleges saw a net gain of about 11%.

In contrast with Statistics and Calculus courses, Econometrics courses are typically only required or offered by an economics major program, and are seldom found in an institution or department's general education requirements. Thus, this finding seems to support the notion that this study's data are generally lower than the findings of Petkus et al.'s (2014) study due to differences in methods, as opposed to significant errors.

Additionally, Econometrics is likely the least affected by the differences in methods, as they are most often of economics major program requirements, which were the focus of this study's data collection. Thus, this finding may indicate a real rise in the tendency of economics major programs to require an Econometrics course.

v. As a whole, the percent of *all* major programs requiring a Calculus course will be at or above 40.7%, as previously found by Petkus et al. (2014).

1. Finding: The hypothesis is not supported by this study's data, with this study finding that only 9.43 percent of all economic major programs required some form of Calculus. This seems to be more concrete evidence of the likely presence and impact of differences between this study's methods and those of Petkus et al.'s (2014) study. Statistics and Calculus courses appear to be most often required by a department or institutions general education requirements, and not by an economics major program's own requirements. As this study purposefully did not extensively collect data outside of an economics major's stated requirements, the strikingly low percentage of economics major programs requiring at least one Calculus course seems more representative of what is actually listed as required by economics major programs themselves.

vi. *within each* institution type, the percent of major programs requiring a Calculus course will be the same or have increased.

1. Finding: The hypothesis is not supported by this study's data. Petkus et al.'s (2014) study found that within each institution type, about 30% to 80% of economics major programs required Calculus. By contrast, within institution types this study found that at most, 15.9% of economic major programs in National Universities required some form

of Calculus, and, at least, 0 percent of economics major programs at Regional Colleges required Calculus.

This seem to be more concrete evidence of the likely presence and impact of differences between this study's methods and those of Petkus et al.'s (2014) study. Statistics and Calculus courses appear to be most often required by a department or institutions general education requirements, and not by an economics major program's own requirements. As this study purposefully did not extensively collect data outside of an economics major's stated requirements, the strikingly low percentage of economics major programs requiring at least one Calculus course seems more representative of what is actually listed as required by economics major programs themselves.

Table 1

Petkus et al.'s (2014) "Core Economics Requirements in Economics Major Programs"

		Total	[National] Universities	Masters ^a	Liberal Arts	Baccalaureates ^b
Economics major programs						
Percentage requiring						
	Principles of Economics	99.9	99.8	100	100	100
	Intermediate Microeconomics	94.8	99.3	92.9	93.8	82.4
	Intermediate Macroeconomics	94.1	98.6	92.4	92.8	80.9
	Statistics	93.9	95.3	93.6	91.4	97.1
	Econometrics	40.7	51.4	32.4	46	14.7
	Calculus	64.3	78.9	53.1	70.1	33.8
<i>N</i>		1,601	554	688	291	68
Schools with Economics degrees						
	Number of economics major programs offered (mean)	2	2.3	2.2	1.6	1.3
	Percentage offering a minor	84.5	82.3	85.5	86.5	81.8
<i>N</i>		792	237	317	185	53

Note. Will reach out to author and publisher for permission to use and publish.

^a *U.S. News* now calls "Regional Universities"

^b *U.S. News* now calls "Regional Colleges"

Table 11

Economic Core Requirements in Economics Major Programs, Explicit + Alternative^a (No honors)^b

	Total	National Universities	Regional Universities	National Liberal Arts Colleges	Regional Colleges
Economics major programs					
Percentage requiring					
Principles of Economics ^c	89.78	88.67	90.44	91.93	82.46
All-in-One Intro Micro-Macro	9.72	8.15	4.6	24.21	0
Intro to Microeconomics	81.07	81.31	87.13	68.77	82.46
Intro to Macroeconomics	80.49	81.11	86.40	67.72	82.46
Intermediate Microeconomics	83.08	84.89	81.25	86.67	66.67
Intermediate Macroeconomics	85.39	86.88	84.01	88.77	68.42
Statistics	13.53	16.9	11.76	13.33	1.75
Econometrics	50.4	55.86	45.59	54.74	26.32
Calculus	9.43	15.9	6.07	6.32	0
<i>N (major programs)</i>	1389	503	544	285	57
Schools with Economics degrees					
Number of economics major programs offered (mean)	1.73	1.98	1.7	1.57	1.19
<i>N (schools with at least one economics major)</i>	804	254	320	182	48

Note. Table adapted from elements of Petkus et al. (2014), Siegfried et al (1991a), Siegfried et al. (1991b), Siegfried and Wilkinson (1982), and the 2017 *U.S. World and News Report* (2016). Permissions pending. The concepts of "explicit" versus "alternative", and breaking down Principles into, All-in-One Intro Micro-Macro, Intro to Microeconomics, and Intro to Macroeconomics, are both novel to this study.

^a Data in table reflects the aggregate of "explicit" and "alternative" course requirements; adding alternatives at most, in one instance, about seven percent to any given explicit data set, and most of such data only increased by about two to three percentage points relative to the explicit figure.

^b "No honors" refers to this table excluding all recorded "honors" economic major programs, so as to not inflate the number of programs counted relative to Petkus et al. (2014).

^c Equivalent to the variable "Principles of Economics", used in both Petkus et al.'s (2014) and Siegfried and Wilkinson's (1982) studies, meaning the percent of institutions that require at least one semester of a course that satisfies Foundations I (i.e. at least one requirement that can be counted as "All-in-One Intro Micro-Macro", "Explicit Intro to Micro", "Alternative Intro to Micro", "Explicit Intro to Macro", or "Alternative Intro to Macro")

2. By institution type and as a whole, how has Petkus et al.'s (2014), "distribution of principles [Siegfried et al.'s (1991a; 1991b) Foundations I] courses in economics major programs" (p. 60; see Table 2), changed (see Table 12)? Additionally, what else can be learned from this approach to displaying data in Table 12?

Note, for the sake of time, this study did not collect data on whether or not programs require students take their Foundations I courses in a specific order when two Foundations I courses are required, as Petkus et al. (2014, p. 60) do (Siegfried et al., 1991a; Siegfried et al., 1991b). This study also excludes Petkus et al.'s (2014) variable, "percentage of major programs allowing either" (p. 60), which refers to whether programs require one or two semesters of Siegfried et al.'s (1991a; 1991b) Foundations I courses. This second variable of Petkus et al.'s (2014) study was left out of this study because the construct is unexplained somewhat vague.

Before and during data collection it was thought that a program can only have a minimum requirement of zero, one, or two semesters of Principles or other courses. A choice of taking either one or two semesters of Principles courses makes it sounds like one semester is required and the other can only be optional, not required. When this study's processes and data are updated, such nuances of curricula requirements and offerings will be captured and assessed, completing the framework for Study 1b, Study 1c, and Study 1d.

Requirements specifying students are to choose one or more courses from a specific pair or pool, can only be counted as having fulfilled a specific Foundations requirement if structured so that all of the choices can only fulfill the same specific Foundations requirement. That is regardless of whether the choices fulfill a specific Foundations

requirement under Explicit or Alternative terms, they will be counted as long as they can all be thought of as fulfilling a the same Foundations requirement. To clarify, if students were to choose between taking one or two semesters of some combination of Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro, absent a specific Principles requirement, no Principles are counted as required, as students can take one and avoid the others.

Finally, meaning in comparisons of introductory economics course requirements lies in the types of courses being required; the number of semesters is derivatively apparent and seems strange as a primary focus. This study individually tracks whether or not Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro courses are required by a major program, allowing for a more refined image of Foundations I requirements (Siegfried et al., 1991a; Siegfried et al., 1991b). Two approaches are used in the analysis of the distribution of Foundations I requirements. The first is Petkus et al.'s (2014) method, programs requiring one introductory course vs programs requiring at least two introductory courses, all by institution type, for direct comparisons in analyses. The second approach is novel, reporting on the permutations of economic major programs Foundations I requirements (Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro) as distributed by institution type.

- a. Regarding the distributions of Foundations I (Principles) courses, it is hypothesized that
 - i. the, "percentage of major programs requiring only a one-semester course" (Petkus et al., 2014, p. 60) that falls under Siegfried et al.'s (1991a; 1991b)

Foundations I (i.e. Intro to Microeconomics, Intro to Macroeconomics, and All-in-One Intro Micro-Macro, or their equivalents) will:

1. decrease in total, falling below the current 12.3% (Petkus et al., 2014, p. 60), as this study predicts institutions will have generally increased the degree to which they require two semesters of Principles courses.
 - a. Finding: This study's data support this hypothesis. This study found the total percent of major programs requiring only one semester of Foundations I courses fell to 10.8%. As stated, differences in methods seem to have resulted in this study's Foundations I and Foundations II findings being about 10% less than Petkus et al.'s (2014) findings in general.

However, unlike Petkus et al. (2014), this study gathers and reports the Principles data in terms of three different types of Foundations I requirements. Aside from information about these individual course requirements being made visible, when combined with data on major programs requiring one or two semesters of Principles, nuances become apparent. The biggest to be seen in Table 12 is that for all, and within each, institution type, the percent of major programs requiring only one semester of a Foundations I course are almost exactly match the percent of major programs requiring an All-in-One Intro Micro-Macro course. This would seem to indicate that almost all programs requiring only one semester of

Foundations I courses, just require an All-in-One Intro Micro-Macro. As will be discussed shortly, comparing the percent of majors requiring two or more semesters of Foundations I courses relative to the individual Intro to Macroeconomics and Intro to Microeconomics requirements seems to strengthen this idea.

2. decrease within each institution type, as compared with Petkus et al.'s (2014) findings, *except* for national liberal arts institutions which this study predicts to stay roughly the same (staying within +/- 2 percent of 36.8%), as it was somewhat of an outlier in Petkus et al. (2014, p. 60), indicating possible institutional differences in curricula structure.
 - a. Finding: This study's data was mixed in supporting this hypothesis. Compared to the percent of major programs requiring only one semester of Principles in Petkus et al. (2014), this study found a decline within all institution types, *except* Regional Universities, which saw slight rise from 4.5 percent to 5.7 percent. National Universities fell from 10% to 7.75 percent, and Regional Colleges fell from 4.4 percent to zero percent. National Liberal Arts Colleges are still most likely to have major programs only requiring one semester of Principles, at 24.56%, but fell from 36.8% as compared to Petkus et al.'s (2014) finding. As explained, differences in methods may be large enough to overturn or noticeably alter

these findings, particularly with approximately 10% fluctuation
Principles courses may be subject to.

- ii. accordingly, the percentage of major programs requiring two or more courses that falls under Foundations I (i.e. Intro to Microeconomics, Intro to Macroeconomics, an All-in-One Intro Micro-Macro, or their equivalents) will:

- 1. increase, rising above Petkus et al.'s (2014) finding of 85.1%.

- a. Finding: This study's data did not support this finding. In spite of the slight drop in the total percent of major programs requiring only one semester of economics, this study's findings suggest that this did not translate into a gain in the number of major programs requiring two or more semesters of Foundations I courses. Instead, this study found that 79.9% of all major programs require two or more semesters of Foundations I courses. As explained, differences in methods may be large enough to overturn or noticeably alter these findings, particularly with the approximately 10% fluctuation
Principles courses may be subject to.

- 2. increase within each institution type, *except* within national liberal arts institutions which this study predicts to stay roughly the same (staying within +/- 2 percent of 36.8%).

- a. Finding: This study's data was mixed in supporting this hypothesis. Compared to the percent of major programs requiring two semester of Principles in Petkus et al. (2014), this

study found a decline within all institution types, *except* National Liberal Arts Colleges. National Liberal Arts Colleges saw a slight rise from 62.2% to 67.37%, essentially maintaining proportion. This is likely influenced to some degree by the possible absence of programs requiring only one semester of Foundations but via less easily identifiable department or institution general education requirements (i.e. differences in methods).

Regarding the other institution types, National Universities fell from 86.3% to 80.91%, Regional Universities 93% to 84.74%, and Regional Colleges fell from 92.7% to 82.46%. As explained, differences in methods may be large enough to overturn or noticeably alter these findings, particularly with approximately the approximately 10% fluctuation Principles courses may be subject to.

Table 2

Petkus et al.'s (2014) "Distribution of Principles Courses in Economics Major Programs"

Course Option	Total	[National] Universities	Masters ^a	Liberal Arts	Baccalaureates ^b
Percent of major programs requiring only a one-semester course	12.3	10	4.5	36.8	4.4
Percent of major programs requiring only a two-semester course	85.1	86.3	93	62.2	92.7
Percent of major programs allowing either	2.7	3.8	2.5	1	2.9
<i>N</i>	1600 [<i>sic</i>]	553 [<i>sic</i>]	688	291	68
Two-semester sequence					
Percentage requiring macroeconomics first	8.1	6.2	8.4	8.7	16.9
Percentage requiring microeconomics first	23	28.9	21.8	13	18.5
Percentage order does not matter	69	64.9	69.9	78.3	64.6
<i>N</i>	1404	498	657	184	65

Note. Will reach out to author and publisher for permission to use and publish.

^a *U.S. News* now calls "Regional Universities"

^b *U.S. News* now calls "Regional Colleges"

Table 12

Distribution of Principles Courses in Economics Major Programs, Explicit + Alternative^a(No honors)^b

	Total	National Universities	Regional Universities	National Liberal Arts Colleges	Regional Colleges
Percent of major programs requiring only <i>one semester</i> of Principles (Foundations I) courses	10.08	7.75	5.7	24.56	0
Percent of major programs requiring <i>two or more semesters</i> of Principles (Foundations I) courses	79.7	80.91	84.74	67.37	82.46
Percent of major programs requiring some form of					
All-in-One Intro Micro-Macro	9.72	8.15	4.6	24.21	0
Introduction to Microeconomics	81.07	81.31	87.13	68.77	82.46
Introduction to Macroeconomics	80.49	81.11	86.4	67.72	82.46
<i>N (major programs)</i>	1,389	503	544	285	57

Note. Table adapted from elements of Petkus et al. (2014), Siegfried et al (1991a), Siegfried et al. (1991b), Siegfried and Wilkinson (1982), and the 2017 *U.S. World and News Report* (2016). Permissions pending. The concepts of Explicit vs Alternative, Honors vs No Honors, and breaking down Principles into, All-in-One Intro Micro-Macro, Intro to Microeconomics, and Intro to Macroeconomics, are novel to this study.

^a Data in table reflects the aggregate of Explicit and Alternative course requirements.

^b "No honors" refers to this table excluding all recorded "honors" economic major programs, so as to not inflate the number of programs counted relative to Petkus et al. (2014).

3. As per Petkus et al.'s (2014, p.58) method of rank analysis, how do the economic core requirements of economics major programs in institutions with ranks 1 through 50 in the *2017 U.S. News and World Report* (2016) institution types National Universities and National Liberal Arts Colleges both compare to the Remaining programs within each institution type in Table 13, and to Petkus et al.'s (2014, p. 58) findings in Table 3?

a. Hypotheses:

- i. comparisons of the Top 50 to all below institutions, both within National Universities and within National Liberal Arts Colleges will reveal that Petkus et al.'s (2014, p. 58) findings generally hold, except that each of the four groups will have seen an increase in the percent requiring both Econometrics and Calculus.

1. Finding: As discussed, differences between this study's methods and Petkus et al.'s (2014) methods are likely the primary contributor to this study's data on Calculus being significantly lower, across the board, as compared to Petkus et al.'s (2014) data. However, this study's methods are a close reflection of what economics major programs' own requirements are, whereas Petkus et al.'s (2014) data reflects requirements outside of a given major program's own requirements. Calculus requirements, while less common than Statistics requirements in Petkus et al.'s (2014) study, are seemingly similar to Statistics requirements in that they are often required by the general requirements of a department or institution, and thus less often listed as required by the actual major program in such a context.

In contrast, when Econometrics is required, it is often required as part of the economic major program's specific requirements, and almost never by a department or institutions general requirements. In this context, while this study cannot perform a direct comparison of this study's and Petkus et al.'s (2014) Calculus requirements, it can fairly reasonably perform a direct comparison of Econometrics requirements. Further, while this study cannot compare Calculus directly, this study can compare the impact of rank (in terms of the percent gap between Top 50 and Remaining) within this study's findings (see Table 13) to the differences within Petkus et al.'s (2014, p.58; see Table 3).

For Econometrics requirements of economics programs in the Top 50 ranked National Universities, this study's findings in Table 13 indicate little change since Petkus et al.'s (2014, p.58; see Table 3) study. Specifically, this study's findings for Econometrics requirements of economics programs in the Top 50 ranked National Universities are 1.86 percent less than Petkus et al.'s (2014, p.58). Between differences of methods and errors, it is hard to say how much change, and in what direction, has occurred within these Top 50 National Universities' Econometrics requirements, but as so far discussed, if Petkus et al.'s (2014) likely methods were reapplied, it seems likely this study's Econometrics findings would rise slightly above Petkus et al.'s (2014 p.58; see Table 3) findings.

In contrast, though in the same context of methods and error, this study found that the Econometrics requirements of economics programs in the Remaining ranked National Universities have risen by 5.15 percent since Petkus et al.'s (2014, p. 58) findings. As it is likely any differences between this study's findings and Petkus et al.'s (2014) findings, whether due to method or error, would only increase, and not decrease, this study's Econometrics findings, it seems safe to say that Econometrics requirements have risen for all programs in National Universities, but perhaps slightly more so in the Remaining, with the Top 50 being fairly consistent.

Econometrics requirements of economic major programs in National Liberal Arts Colleges programs seem to have generally increased since Petkus et al.'s (2014, p.58; see Table 3) findings, for both the Top 50 and Remaining institution pools. Specifically, this study found the percent of major programs in Top 50 National Liberal Arts Colleges requiring Econometrics has gone up by 14.35%, from 57.8% (Petkus et al., 2014, p. 58; Table 3) to 72.15% (see Table 13). Similarly, this study found the percent of major programs in Remaining National Liberal Arts Colleges requiring Econometrics has gone up by 6.76 percent from 41.3% (Petkus et al., 2014, p. 58; Table 3) to 48.06% (see Table 13).

Again, while this study cannot directly compare its' Calculus data with Petkus et al.'s (2014, p. 58; see Table 3) data, there are some

speculative comments that may be made concerning the differences between the Top 50 and Remaining Calculus requirements within the contexts of our respective studies. First, this study's rank analysis of Calculus requirements for economics programs in National Universities found that 14.81% of programs in Top 50 National Universities require Calculus, slightly less than, but almost identical to, the 16.2% of programs in Remaining National Universities that require Calculus (see Table 13); approximately a one to one ratio. In contrast, Petkus et al. (2014, p. 58; see Table 3) found 97% of programs in Top 50 National Universities to require Calculus, and 74.8% of programs in Remaining National Universities to require Calculus; approximately a ratio of four to three, respectively.

Just as speculatively, this study's rank analysis of Calculus requirements for economics programs in National Liberal Arts Colleges found that 7.59 percent of programs in Top 50 institutions require some form of Calculus; about 1.76 percent higher than the 5.83 percent of Remaining National Liberal Arts programs requiring Calculus (see Table 13). This yields an approximate ratio of four to three, respectively. Petkus et al. (2014, p. 58; see Table 3) found 89.2% of programs in Top 50 National Liberal Arts Colleges to require Calculus, and that 62.5% of programs in Remaining National Universities require Calculus; by a ratio of approximately three to two, respectively.

No definitive statements may be made in comparing this study's Calculus requirement data to Petkus et al.'s (2014, p.58; see Table). It is loosely speculated that comparisons of this study's and Petkus et al.'s (2014) rank related Calculus findings may indicate slight reductions in differences between Calculus requirements of programs in Top 50 and Remaining National Universities. Additionally, there may be slightly smaller reductions in the difference between Calculus requirements in Top 50 and Remaining National Liberal Arts Colleges.

Until minor revisions and the rest of Phase One are complete, comparisons to Petkus et al.'s (2014) data are generally ambiguous and not terribly definitive at the moment, with the exception perhaps of the Econometrics requirement. However, the value of this immediate study's design and preliminary findings is that they closely reflect what economic major program's own listed Explicit requirements are, with a little wiggle room added by this study's creation and use of Alternative requirements in its methods, all in terms of a program's minimal fulfillment of eight economic core requirements representing Siegfried et al.'s (1991a; 1991b) Foundations requirements (see Table 11). In this sense, the degree to which major programs themselves require a specific Foundations course can vary radically as a result of certain institution types to require such courses as part of their general education requirements, or for that matter not at all. Thus, as differences in method at the moment

prohibit direct comparisons to Petkus et al.'s (2014) data, until future studies are completed, no definitive statements concerning changes in Econometrics and particularly Calculus requirements in terms of rank can be made.

However, this does not undermine this study's data or rank analysis since this study's data is representative of the economics programs' own stated Foundations requirements. If this study's methods assumptions and findings are appropriately accounted for, this study's rank analysis of Foundations requirements for all four institution types (see Table 13) stands on its own in terms of relevance, even under the current status of preliminary findings. In this context, this section concludes with several general observations concerning rank, Calculus, and Econometrics in National Universities and National Liberal Arts Colleges.

First, there would appear to be a real difference in the extent to which major programs in National Universities and National Liberal Arts Colleges list Calculus as a requirement, regardless of rank (see Table 13). Specifically, National Universities have the highest percent of major programs with a Calculus requirement. Second, though Calculus requirements were found to be generally lower in National Liberal Arts Colleges as compared to National Universities, within both institution types, the percent difference between the respective institution types' Top 50 and Remaining Calculus requirements was

between one and two percent. These first two findings seem to indicate that, at least concerning an economics program's own requirements, institution type is likely more of a factor than rank, though as will be discussed, Regional Universities does upset this slightly.

Finally, for Econometrics it can be fairly definitively stated that rank does indeed seem to be associated with the degree to which major programs have Econometrics requirements. This seems particularly true for both National Universities and National Liberal Arts Colleges, which had not only the highest Econometrics requirements among institution types in their respective Top 50 and Remaining categories, but also had the widest, almost identical, gaps within each institution types' Top 50 and Remaining (see Table 13). As will be discussed, this Econometrics finding seems to hold, albeit to a lesser extent, for other institution types.

- ii. within this study's data (see Table 13) comparisons of Top 50 institutions to Remaining institutions, both within National Universities and within National Liberal Arts Colleges, will reveal differences in the extent to which each of the economic core courses are required by top and remaining institutions
 - 1. Finding: This study initially only planned on applying rank analysis to National Universities and National Liberal Arts Colleges, as it was all Petkus et al. (2014) appeared to have examined, seemingly due to the complicated ways the *U.S. News and World Report* ranks their other two institution types (see Table 7, Table 8, Table 9, Table 10).

However, as this study's analyses and reporting concluded, this author found a way to apply Petkus et al.'s (2014, p. 58; see Table 3) rank analysis to the other two institution types of the *U.S. News and World Report*, Regional Universities and Regional Colleges, for the first time in Table 13 below. For this reason, this study explores this hypothesis, concerning National Universities and National Colleges, in an integral fashion with Regional Universities and Regional Colleges immediately below.

- b. **Unplanned Findings:** As alluded to earlier in the paper, and as reflected in the above hypotheses and findings, this study originally only planned on performing a rank analysis identical to Petkus et al.'s (2014, p. 58) study. This was because the *U.S. News and World Report* ranks Regional Universities and Regional Colleges each via four independently ranked regional subcategories, making a Top 50 analysis seemingly impossible. However, after all the data was collected, analyzed, and discussed, this author realized that the raw assessment scores used by the *2017 U.S. News and World Report* (2016) can be used to determine what the true Top 50 institutions are among the aggregate of institutions within Regional Universities and Regional Colleges respectively. This realization allows for this study to present the first ever exploration of rank, via Petkus et al.'s (2014, p. 58) methods, as it relates to economics major programs in Regional Universities (the largest institution type) and Regional Colleges (the smallest institution type). These findings can be seen with the other rank findings in Table 13.

- i. General characteristics of rank data: Using the raw scores to identify the Top 50 rankings for institutions within each of the four *2017 U.S. News and World Report* (2016), this study found there to be 208 Top 50 ranked institutions among the 1,536 institutions in the *2017 U.S. News and World Report* (2016; see Table 16). Of these 208 Top 50 institutions in the *2017 U.S. News and World Report* (2016), this study found 168 institutions, or about 81%, offer at least one economics major program (see Table 13). Of the remaining 1,328 institutions that did not rank in the Top 50 of their *2017 U.S. News and World Report* institution type, 636 institutions, or about 48%, offer at least one economics major program (see Table 13). It is worth noting that the 26 Honors programs identified in this study's preliminary findings tended to be in the Top 50 institutions and slightly increase the gaps in course requirements, but they are not included in this study's rank analysis at this time.

Within institution types, additional differences can be seen in the extent to which the Top 50 ranked institutions might offer an economics major program (see Table 13). This study found that 52 of the 53 Top 50 ranked National Universities in the *2017 U.S. News and World Report* (2016) offered at least one economics major program. Somewhat similarly, 50 of the 55 Top 50 Regional Universities, and 46 of the 50 Top 50 National Liberal Arts Colleges, were found to offer at least one economics major. In contrast, 20 of the 50, or 40%, of Top 50 Regional Colleges were found to offer at least one economics major program.

202 of 257, or about 80%, of Remaining National Universities were found to offer at least one economics major program. Of the 598 Remaining Regional Universities, 270, or 45%, were found to offer at least one economics major program. 136 of 189, or 72%, of the Remaining National Liberal Arts Colleges were found to offer at least one economics major program. Regional Colleges was again an outlier, with 28 of 284, or 10%, of Remaining institutions offering at least one economics major program.

Perhaps also worthy of description are the proportion of major programs, in total and within each institution type, that are of Top50 institutions, relative to the proportion of programs that are of Remaining institutions. These are interesting, as the proportion major programs offered by Top 50 and Remaining institutions varies by institution type. Specifically, of the 503 economic programs in National Universities, 21.47%, or about two in ten, major programs are in a Top 50 National University. Of the 544 economics programs in Regional Universities, again about two in ten (20.04%) programs are in Top 50 institutions. About three in ten (27.72%) of the 285 economics programs in National Liberal Arts Colleges are in a Top 50 institution, and about four in ten (42.12%) of the 57 economics programs in Regional Colleges are in Top 50 institutions.

In Table 13, as an aggregate, Top 50 institutions with at least one economics major, offer a mean of 1.91 major programs per institution, and the the aggregate of Remaining institutions with at least one economics major in Table 13 offer a mean of 1.68 programs per institution. In comparison, the

population mean in Table 11 is 1.73 programs per institution. National Universities had the second highest number of programs in Top 50 institutions, one more than the total number of programs in Top 50 Regional Universities which offer more programs in terms of number over all

Overall, Regional Universities has the largest number of institutional and offers the largest number of economics programs, but has the second highest mean (1.7) for programs offered per institution, compared to the next largest institution type, National Universities, offering a mean of 1.98 programs per National University (see Table 11). This contrasts with Top 50 Regional Universities in Table 13 offering the highest mean of 2.18 programs per institution, and with Top 50 National Universities in Table 13 offering the second highest mean of 2.08 programs per institution. Further, in Table 13, the Remaining National Universities offer the highest mean (1.96) of programs per institution, while the mean number of programs per Remaining Regional Universities falls well below all afore mentioned means to 1.61 programs per institution.

With the third largest number of institutions and programs National Liberal Arts Colleges, and an overall mean of 1.57 major programs per institution in Table 11, in Table 13 National Liberal Arts Colleges also have the third highest means for the number of programs offered by Top 50 and Remaining, respectively at 1.72 and 1.52 programs per National Liberal Arts College. Again sticking out some, Regional Colleges, which offer a general mean of 1.19 major programs per institution in Table 11, have the lowest

means for Top 50 and Remaining programs in Table 13, at 1.2 and 1.18 major programs per institution respectively.

While the largest difference between means of programs offered by Top 50 and Remaining institutions of a given institution type is within Regional Universities, a difference of 0.57 (2.18-1.61), National Liberal Arts Colleges has the second largest difference between the mean number of programs offered by Top 50 and Remaining institutions, with a difference of 0.2 (1.72-1.52) (see Table 13). The difference between the mean number of programs offered at Top 50 and Remaining National Universities in Table 13 was 0.12 (2.08-1.96). The smallest difference between the mean number of programs offered at Top 50 and Remaining institutions was between the means of Top 50 and Remaining Regional Colleges (0.02=1.2-1.18).

- ii. Foundations I: Examining the Foundations I requirements of economics programs by rank in Table 13, several things are apparent. In Table 13, Principles of Economics percentages represent the percent of major programs that required at least one of the three Foundations I courses; All-in-One Intro Micro-Macro, Intro to Microeconomics, and Intro to Macroeconomics. In Total, economics programs in Remaining institutions, at 88.26%, require Principles of Economics slightly more often than the programs in Top 50 institutions, at 88.11%, overall.

This overall difference is so slight that it could be upset by unresolved errors or by including Foundations I courses required outside of the economics program's own stated requirements. However, this study's data is a

close representation of a given program's Explicit requirements, with slightly greater amount of internal and external course requirements included as Alternative fulfilment of Foundations I requirements, and within each institution type further differences between the Principles of Economics requirements of Top 50 and Remaining institutions emerge. For Regional Universities in Table 13, Principles of Economics requirements for major programs in Top 50 (89.91%) and Remaining (90.57%) Regional Universities are almost equal, though again programs in Top 50 institutions require some form of Foundations I course about slightly less often than the programs in Remaining institutions.

Major programs in Top 50 National Universities also have slightly lower Principles of Economics requirements than programs in Remaining National Universities, but by a larger margin, in fact being closest to Regional Colleges Top 50. Whereas as the differences between programs in Top 50 and Remaining institutions in Total and Regional Universities are less than one percent, there is a little over a five percent difference between Principles of Economics requirements for major programs in Top 50 (84.26%) and Remaining (89.87%) National Universities (see Table 13). National Liberal Arts Colleges and Regional Colleges flip the Principles of Economics rank tendency described so far.

94.94% of economics programs in Top 50 National Liberal Arts Colleges required at least one Foundations I course, about four percent more than the 90.78% of major programs in Remaining National Liberal Arts Colleges with

a Principles of Economics requirement (see Table 13). Major programs in Top 50 Regional Colleges also had greater Principles of Economics requirements than major programs in Remaining Regional Colleges; at 83.33% and 81.82% respectively, there is a little over a one percent difference (see Table 13).

There are also important rank differences in the types of Foundations I courses required. Regional Colleges have no programs requiring an All-in-One Intro Micro-Macro course. Instead, programs in Regional Colleges with any Foundations I requirement require both Intro to Microeconomics and Intro to Macroeconomics, and thus mirrors the Principles of Economics results for Regional Colleges. However, in Total, and within all three other institution types, major programs in Top 50 institutions noticeably require All-in-One Intro to Micro-Macro more often than programs in Remaining institutions.

In Total, 16.42% of major programs in Top 50 institutions and 6.92 percent of programs in Remaining institutions require All-in-One Intro to Micro-Macro (see Table 13). All-in-One Intro Micro-Macro is usually not required along with one or both of Intro to Microeconomics and Intro to Macroeconomics, but is rather a substitute. As a result, in Total and across the three institutions types except Regional Colleges which did not require All-in-One Intro Micro-Macro, requirements for both Intro to Microeconomics and Intro to Macroeconomics are lower for programs in Top 50 institutions than for Remaining institutions.

Economics programs in Top 50 and Remaining National Liberal Arts Colleges had both the greatest All-in-One Intro to Micro-Macro requirements

for their respective categories, and the largest difference between All-in-One Intro Micro-Macro requirements of programs in Top 50 and Remaining institutions. Specifically, 37.97% of major programs in Top 50 National Liberal Arts Colleges, and 18.93% of major programs in Remaining National Liberal Arts Colleges required an All-in-One Intro Micro-Macro course, for a difference of 19.04% (see Table 13). The relatively high percentage of programs in Top 50 and Remaining National Liberal Arts Colleges requiring All-in-One Intro Micro-Macro yields the lowest Intro to Microeconomics and Intro to Macroeconomics requirements for major programs in Top 50 and Remaining institutions of any institution type (see Table 13). However, programs in National Liberal Arts Colleges have the second largest gaps between Top 50 and Remaining requirements for both Intro to Microeconomics ($73.36 - 56.96 = 16.34\%$) and Intro to Macroeconomics ($71.36 - 58.23 = 13.13\%$).

Programs in National Universities have the second highest set of Top 50 and Remaining All-in-One Intro Micro-Macro requirements. About equal to the All-in-One requirements of Remaining National Liberal Arts Colleges, 19.44% of programs in Top 50 National Universities require an All-in-One Intro Micro-Macro course, while in contrast 5.06 percent of programs in Remaining National Universities. This yields the second largest within institution difference between Top 50 and Remaining All-in-One Intro Micro-Macro requirements, a difference of 14.38%.

Within National Universities, the combination of All-in-One Intro Micro-Macro requirements and additional Foundations I requirements yields the second lowest Intro to Microeconomics and Intro to Macroeconomics requirements for major programs in Top 50 institutions, and the second highest Intro to Microeconomics and Intro to Macroeconomics requirements for Remaining institutions (see Table 13). In turn, National Universities have the largest gaps between Top 50 and Remaining requirements for both Intro to Microeconomics ($85.32 - 66.67 = 18.65\%$) and Intro to Macroeconomics ($85.06 - 66.67 = 18.39$). As Regional Colleges did not have any All-in-One Intro Micro-Macro courses listed, Regional Universities came in third in terms of its All-in-One Intro Micro-Macro requirements for programs in both Top 50 and Remaining institutions.

In addition to having the third smallest set of All-in-One Intro to Micro-Macro requirements in Table 13, the difference between the requirements at Top 50 and Remaining Regional Universities was the smallest ($8.26 - 3.68 = 4.58\%$). With the second highest Foundations I requirements for both Top 50 and Remaining institutions (see Principles of Economics in Table 13), Regional Universities have the highest percentage of programs in Top 50 and Remaining institutions requiring both Intro to Microeconomics and Intro to Macroeconomics (see Table 13). Between program requirements for Intro to Microeconomics and Intro to Macroeconomics at Top 50 and Remaining Regional Universities, there is a slightly larger rank based gap than in Regional Colleges, but much smaller than the gap in National Universities or

National Liberal Arts Colleges. In Table 13, Regional Universities have a gap between Top 50 and Remaining requirements for Intro to Microeconomics of 4.56 percent ($= 88.05 - 83.49$), and between Top 50 and Remaining requirements for Intro to Macroeconomics of 4.79 percent ($= 87.36 - 82.57$).

Also interesting was that while programs can be generally delineated by those requiring All-in-One Intro Micro-Macro, or both Intro Microeconomics and Intro to Macroeconomics, the percent of programs requiring either of the latter did not always match, indicating some programs require only one. In general it seemed that across all institutions, except Regional Colleges which had equal requirements, programs in Remaining institutions had slightly greater Intro to Microeconomics requirements than Intro to Macroeconomics requirements, which is reflected in the Total column of Table 13. In contrast, the Top 50 Total column in Table 13 shows a slight tendency towards Intro to Macroeconomics. This slight overall tendency is borne out in ties within the Intro to Microeconomics and Intro to Macroeconomics requirements of Top 50 National Universities and Regional Colleges, in Top 50 Regional Universities favoring Intro to Microeconomics, and in Top 50 National Liberal Arts Colleges favoring Intro to Macroeconomics.

- iii. Foundations II: Examining the Intermediate Microeconomics and Intermediate Macroeconomics requirements of economics programs by institution rank in Table 13, several things are apparent. By institution type, programs in Top 50 National Liberal Arts Colleges had the greatest Intermediate Microeconomics (91.14%) and Intermediate Macroeconomics

(88.61%) requirements of any programs in Top 50 institutions. However, the programs in Remaining National Liberal Arts Colleges and Remaining National Universities had similar, sometimes even slightly greater, Intermediate Macroeconomics requirements, at 88.83% and 87.85% respectively. Programs in Top 50 Regional Universities had the second highest set of Foundations II requirements for Top 50 programs, with 85.32% of programs in Top 50 Regional Universities requiring Intermediate Microeconomics, and 83.49% of programs in Top 50 Regional Universities requiring Intermediate Macroeconomics.

Again, some programs in Remaining institutions had similar or even slightly greater, Foundations II requirements than programs in Top 50 Regional Universities (see Table 13). 85.32% of programs in Remaining National Universities and 84.95% of Remaining National Liberal Arts Colleges require Intermediate Microeconomics. 84.14% of programs in Remaining Regional Universities require Intermediate Macroeconomics. Programs in Remaining Regional Universities also have the third lowest Intermediate Microeconomics requirements for programs in Remaining institutions, at 80.23%.

For Foundations II requirements of programs in Top 50 institutions, programs in Top 50 National Universities have the third lowest set of Foundations II requirements within each institution types' Top 50. Specifically, 83.33% of programs in Top 50 National Universities require both Intermediate Microeconomics and Intermediate Macroeconomics (see Table

13). Regional Colleges had the lowest sets of Foundations II requirements for both programs in Top 50 institutions and programs in Remaining institutions. Specifically, of programs in Top 50 Regional Colleges, 70.83% required Intermediate Microeconomics and 75% required Intermediate Macroeconomics. Of programs in Remaining Regional Colleges, 63.64% required both Foundations II courses (see Table 13).

Whereas in the Foundations I rank findings described in the section above there is a tendency for programs in Top 50 institutions to favor Intro to Macroeconomics and for programs in Remaining institutions to favor Intro to Microeconomics, this was generally the opposite for Foundations II rank findings. Specifically, Total Remaining institutions tend to favor Intermediate Macroeconomics requirements by a margin of 2.58 percent, and Total Top 50 institutions tend to favor Intermediate Microeconomics, but again by a smaller margin, of 0.05 percent (see Table 13).

Programs in Remaining National Universities require Intermediate Macroeconomics by a margin of 2.53 percent more than Intermediate Microeconomics. Programs in Remaining Regional Universities favor Intermediate Macroeconomics over Intermediate Microeconomics by a margin of 3.91 percent, and programs in Remaining National Liberal Arts Colleges favor Intermediate Macroeconomics by a margin of 3.88 percent. Programs in Remaining Regional Colleges, have equivalent Intermediate Microeconomics and Intermediate Macroeconomics requirements.

In Table 13, Top 50 institutions were again comparatively mixed in their preferences. While programs in Top 50 National Universities are again tied in their Intermediate Microeconomics and Intermediate Macroeconomics requirements, programs in Top 50 Regional Universities and Top 50 National Liberal Arts Colleges required Intermediate Microeconomics slightly more often than they require Intermediate Macroeconomics. Programs in Top 50 Regional Colleges have the largest gap between Intermediate Microeconomics and Intermediate Macroeconomics requirements, favoring Intermediate Macroeconomics. There are also mixed differences between the degree to which programs in Top 50 and Remaining institutions require a specific Foundations II course.

In Table 13's Total Column, programs in Top 50 institutions have both greater Intermediate Microeconomics and greater Intermediate Macroeconomics requirements than programs in Remaining institutions. Specifically, Intermediate Microeconomics program requirements in Top 50 institutions are greater than the requirements of Remaining institutions by a margin of about four percent, and Intermediate Macroeconomics program requirements in Top 50 institutions are greater than the requirements of Remaining institutions by a little over one percent. However, within each institution type the Foundations II requirements of programs in Top 50 programs are not always greater than those of the Remaining institutions.

Programs in Remaining National Universities are more likely than programs in Top 50 National Universities to require Intermediate

Microeconomics by a margin of about two percent, and programs in Remaining National Universities are also more likely to require Intermediate Macroeconomics than Top 50 National Universities, by a little over four percent (see Table 13). For Regional Universities, programs in Top 50 institutions are more likely than programs in Remaining Regional Universities to require Intermediate Microeconomics by a little over five percent, but less likely to require Intermediate Macroeconomics by 0.65 percent. National Liberal Art Colleges are similar to Regional Universities.

In Table 13, programs in Top 50 National Liberal Arts Colleges are more likely than programs in Remaining National Liberal Arts Colleges to require Intermediate Microeconomics by a little over five percent, but less likely to require Intermediate Macroeconomics by a margin of 0.22 percent. The only within institution instance of programs in Top 50 institutions having both greater Intermediate Microeconomics requirements and greater Intermediate Macroeconomics requirements than programs in Remaining institutions can be found in Regional Colleges. Regional Colleges also seem to have the largest rank differences for Foundations II requirements. Specifically, programs in Top 50 Regional Colleges are more likely than programs in Remaining Regional Colleges to require Intermediate Microeconomics by a 7.19 percent margin, and more likely to require Intermediate Macroeconomics by a margin of 11.36% (see Table 13).

- iv. Foundations III: In the Total column in Table 13, all three Foundations III courses, Statistics, Calculus, and Econometrics, are required to a greater degree

by economics programs in Top 50 institutions than by programs in Remaining institutions. With three exceptions, this is true of Foundations III requirements within each institution type. The first two exceptions can be seen in the Statistics and Calculus requirements for National Universities, where programs in Remaining National Universities demonstrate relatively small leads over programs in Top 50 National Universities. The third exception can be seen in Regional Colleges, where no programs were found to require Calculus.

Programs in Top 50 and Remaining National Universities have the highest Statistics requirements of all institution types, with 16.67% of programs in Top 50 National Universities, and 16.96% of Remaining National Universities requiring Statistics. 15.6% of Programs in Top 50 Regional Universities and 15.19% of programs Top 50 National Liberal Arts Colleges required Statistics, while 10.8% of programs in Remaining Regional Universities and 12.62% of programs in National Liberal Arts Colleges require Statistics. Programs in Regional Colleges are least likely to require Statistics, with only 4.17% of programs in Top 50 Regional Colleges, and zero percent of Remaining Regional Colleges, requiring Statistics (see Table 13).

Of the rank data in Table 13, Econometrics is the only course type for which, in every instance, programs in a Top 50 institution are more likely to require the course than programs in Remaining institutions. Econometrics also appears to have the most pronounced rank based differences within each institution type of any course type. In the Total column of Table 13, 55.99% of

programs in Top 50 institutions, and 42.03% of programs in Total Remaining institutions, require Econometrics; a difference of 13.96%.

Across all categories of Top 50 and Remaining institutions in Table 13, programs in Top 50 National Liberal Arts Colleges have the greatest Econometrics requirement of all institution types, at 72.15%, and programs in Top 50 National Universities are second in terms of Econometrics requirements at 69.44%. In third place, at 53.21%, Econometrics requirements for programs in Top 50 Regional Universities are close to the Total Top 50 Econometrics requirements. Again with generally lower requirements, 29.17% of programs in Top 50 Regional Colleges require some form of Econometrics (see Table 13).

At 24.24%, programs in Remaining Regional Colleges have the lowest percent of programs with an Econometrics requirement (see Table 13). Regional Colleges also have the smallest within institution type rank gap for Econometrics requirements, with programs in Top 50 Regional Colleges leading against programs in Remaining Regional Colleges by 4.93 percent. The second smallest within institution type rank gap for Econometrics requirements in Table 13 can be seen in Regional Universities, where, of the within institution type comparisons, the third place Econometrics requirements for Top 50 institutions are almost 10% ($= 53.21 - 43.68$) greater than the third place Econometrics requirements for Remaining institutions.

In table 13, within the four institution types, the second largest difference between Econometrics requirements of programs in Top 50 and Remaining institutions, 17.29%, is between Top 50 and Remaining National Universities.

While, at 69.44%, the Econometrics requirements of programs in Top 50 National Universities have the second greatest Econometrics requirements, both in comparison to the Econometrics of other Top 50 institutions and all Econometrics requirements, programs in Remaining National Universities have the greatest Econometrics requirements of all Remaining institution categories in Table 13.

The largest within institution type rank based difference for Econometrics can be seen in National Liberal Arts Colleges between the highest (72.15%) Econometrics requirements, among Top 50 and all institutions, and the second highest among only the Remaining institutions Econometrics requirements (48.06%) (see Table 13). This creates a within institution type rank based difference of 24.09%.

Of Foundations requirements required by an economics program's own stated requirements, and those readily accessible, Calculus requirements are rather low, but still show variation by institution type and rank. In the Total column of Table 13, 8.12 percent of programs in Top 50 institutions are found to have a Calculus requirement; 1.35 percent more than the 6.77 percent of economics programs in Remaining institutions. Calculus requirements by rank range from zero Calculus requirements for programs in Regional Colleges, to the 16.2% of programs in Remaining National Universities.

While programs in Remaining National Universities have the greatest Calculus requirements of all in Table 13, programs in Top 50 National Universities are second overall for their Calculus requirements, have the

greatest Calculus requirements of programs in Top 50 institutions, and, at 14.81%, are only 1.39 percent less than Remaining National Universities' Calculus requirements for economics majors. Not counting Regional Colleges, this 1.39 percent difference in Calculus requirements within National Universities is the smallest rank based difference for Calculus requirements in Table 13. The next smallest rank based gap for Calculus requirements is 1.76 percent, between Top 50 (7.59 percent) and Remaining (5.83 percent) National Liberal Arts Colleges.

Of Top 50 institutions in Table 13, Regional Universities have the second highest percent of programs requiring Calculus, at 10.09%. With the exception of Regional Colleges, programs in Remaining National Liberal Arts Colleges have the smallest Calculus requirements, at 5.06 percent. This yields the largest rank based difference within a given institution type for Calculus requirements in Table 13; a difference of 5.03 percent.

Table 3

Representation of Petkus et al.'s (2014) Rank Analysis and Findings

	National Universities		National Liberal Arts Colleges	
	Top 50	Remaining	Top 50	Remaining
Percentage of programs requiring				
Econometrics	71.3	47	57.8	41.3
Calculus	97	74.8	89.2	62.5

Note. Petkus et al. (2014, p. 58) present their rank analysis in writing, as opposed to in a table.

Table 13

Institution Rank Analysis of Economic Core Requirements in Economics Major Programs, Explicit + Alternative^a (No honors)^b

		Total		National Universities		Regional Universities		National Liberal Arts Colleges		Regional Colleges	
		Top 50	Remaining	Top 50	Remaining	Top 50	Remaining	Top 50	Remaining	Top 50	Remaining
Percent of economics majors requiring											
	Principles of Economics ^c	88.11	88.26	84.26	89.87	89.91	90.57	94.94	90.78	83.33	81.82
	All-in-One Intro Micro-Macro	16.42	6.92	19.44	5.06	8.26	3.68	37.97	18.93	0	0
	Intro to Microeconomics	72.61	82.12	66.67	85.32	83.49	88.05	56.96	73.3	83.33	81.82
	Intro to Macroeconomics	72.7	81.4	66.67	85.06	82.57	87.36	58.23	71.36	83.33	81.82
	Intermediate Microeconomics	82.66	78.54	83.33	85.32	85.32	80.23	91.14	84.95	70.83	63.64
	Intermediate Macroeconomics	82.61	81.12	83.33	87.85	83.49	84.14	88.61	88.83	75	63.64
	Statistics	12.91	10.1	16.67	16.96	15.6	10.8	15.19	12.62	4.17	0
	Econometrics	55.99	42.03	69.44	52.15	53.21	43.68	72.15	48.06	29.17	24.24
	Calculus	8.12	6.77	14.81	16.2	10.09	5.06	7.59	5.83	0	0
<i>N (major programs)</i>		320	1069	108	395	109	435	79	206	24	33
Schools with economics majors											
	Number of economics major programs offered (mean)	1.91	1.68	2.08	1.96	2.18	1.61	1.72	1.52	1.2	1.18
<i>N (schools)</i>		168	636	52	202	50	270	46	136	20	28

Note. Table adapted from elements of Petkus et al. (2014), Siegfried et al (1991a), Siegfried et al. (1991b), Siegfried and Wilkinson (1982), and the 2017 *U.S. World and News Report* (2016). Permissions pending. The concepts of Explicit vs Alternative, Honors vs No Honors, breaking down Principles into, All-in-One Intro Micro-Macro, Intro to Microeconomics, and Intro to Macroeconomics, and the rank analysis of Regional Universities and Regional Colleges, are novel to this study.

^a Data in table reflects the aggregate of Explicit and Alternative course requirements.

^b "No honors" refers to this table excluding all recorded "honors" economic major programs, so as to not inflate the number of programs counted relative to Petkus et al. (2014).

^c Equivalent to the variable Principles of Economics used in both Petkus et al.'s (2014) and Siegfried and Wilkinson's (1982) studies, meaning the percent of institutions that require at least one semester of a course that satisfies Foundations I (i.e. at least one semester of All-in-One Intro Micro-Macro, Intro to Microeconomics, Intro to Macroeconomics, Principles of Economics, Foundations of Economics ect).

Secondary questions

To what extent are the courses Siegfried and Wilkinson (1982) call, “special requirements for the economics major” (p. 131-132) required by undergraduate economics major programs in the U.S.? This refers to whether or not programs require a “comprehensive senior exam (oral or written)”, “independent study course or project”, “senior thesis”, “distributional requirement among subfields of economics”, “specialization requirement within a subfield”, “senior seminar”, or an “internship” (Siegfried & Wilkinson, 1982, p. 131-132; see Table 4).

To this author’s knowledge, no study since Siegfried and Wilkinson (1982) has examined these special requirements. Siegfried and Wilkinson (1982) use five institution types that are slightly different than the four used by Petkus et al. (2014) and the *2010 U.S. News and World Report* (2009) rankings. Both classifications of institution types are based on the *2010 Carnegie Classifications* (Carnegie Foundation, 2011) that were in place during the course of their research. That being said, the data collected in this study can be compared to Siegfried and Wilkinson’s (1982) data on special requirements at the level of all institutions. Siegfried and Wilkinson’s (1982) five institution types (see Table 6) are comparable to this study’s four institution types, as two of the five institution types can be combined and considered roughly equivalent to the institution types of this study and Petkus et al. (2014; see Table 7, Table 8, Table 9, and Table 10).

Specifically, Siegfried and Wilkinson’s (1982) institution types, Research and Doctorate, when merged are comparable to the *2017 U.S. News and World Report’s* National Universities. Additionally, Siegfried and Wilkinson’s (1982) institution type, Comprehensive, is comparable Regional Universities, and Liberal Arts I is comparable to National Liberal Arts Universities.

Siegfried and Wilkinson's (1982) Liberal Arts II institution type is comparable to Regional Colleges.

There is also another slight difference in methods aside from the differences in institution types. As discussed, one of Siegfried and Wilkinson's (1982) Special Requirements is deemed "independent study course or project" (p.132; see Table 4). As there was no variable called a Capstone, but Capstone is essentially equivalent to a Senior Project, and as an Independent Study tends to be more free form, this study decided to merge Senior Project and Capstone, and assess independent studies as their own variable. Overall it is assumed that the methods of this study, particularly the collection of special requirements, are very close to those of Siegfried and Wilkinson's (1982) study, and thus identified differences are less likely from error or methods.

Finally, this author's own knowledge and experience, as current student and as someone with first-hand experience in gathering data on economics curricula, two specific hypotheses were created to guide data analysis and discussion this section. The secondary hypotheses and their findings reflect these and the aforementioned considerations. The data the secondary hypotheses are based upon can be seen in Table 4. This study's comparable findings this section can be seen in Table 15.

1. How do these requirements vary by institution type?

- i. Hypotheses:

1. across and within each institution type, as mostly seen in Siegfried and Wilkinson's (1982, p. 131-132) findings., National Liberal Arts institutions will be more likely to have each type of special

requirement than all other institution types (Siegfried & Wilkinson, 1982, p. 131-132).

- a. Finding: This study's data did was mixed in the support for this hypothesis. Compared with all other institution types, National Liberal Arts institutions were more likely to require a Capstone, a Senior Thesis, a Senior Seminar, or an Internship, than economics major programs of other institution types.

Comprehensive Senior Exams have in total declined significantly, from 11.9% in Siegfried and Wilkinson (1982), to 1.87 percent of all economic programs in this study. National Liberal Arts Colleges now hold second highest percent of major programs requiring a Comprehensive Senior Exam, second only to Regional Universities.

As this study counted Independent Studies as their own category, they have been shown be required an incredibly small percent of the time compared to all other special requirements, with the bulk of Siegfried and Wilkinson's (1982) data apparently laying in the project portion of Independent Study Course or Project, now separately called "Capstone or Senior Project". Due to the very small population of major programs in Regional Colleges, this study's data suggests that independent studies for Regional Colleges to be the only

instance of National Liberal Arts colleges being outdone by Regional Colleges in special requirements.

In spite of the separation from Independent Study, Capstone or Senior Project saw a total increase in the percent of majors requiring it, from 10% in Siegfried and Wilkinson's (1982) study to 14.4% now, with all institution types increasing in Capstone or Senior Project Requirements, except for Regional Colleges, which declined from 15.3% to 7.02 percent. Regional Colleges decline seemingly due to requiring a larger proportion of Independent Studies, but also likely impacted by the number of programs within. National Liberal Arts Colleges had the highest proportion of programs requiring a Senior Project or Capstone, but, with the exception of Regional Colleges, it is only so by slim margins.

Senior Thesis requirements saw large decreases within all institution types, except for National Liberal Arts Colleges, which at 15.44% is a little over double the total average of 6.43 percent, is about 11% to 13% higher than within other institution types, and by contrast is only about one percent lower than Siegfried and Wilkinson's (1982) study.

This study similarly found that presently, 5.17 percent National Universities had a Distributional Requirement among

Subfields of Economics, compared to 4.21 percent of National Liberal Arts Colleges now.

Siegfried and Wilkinson (1982) found that a greater percentage of economics programs in National Liberal Arts Colleges had a Specialization Requirement within a Subfield of Economics more often than the other categories, at 11.2%, than all the other institution types by a noticeable margin.

Standing out is that this study's findings for Specialization Requirement within a Subfield of Economics are identical to those concerning Distributional Requirement among Subfields of Economics. Though it is possible this happened at chance, as the construct is tricky to discern, it seems likely that research assistants check both of these special requirements when they encountered instances they were unsure of. This will become clear in the process of quality control.

National Universities used have the greatest percent of economics major programs requiring a Senior Seminar, but only at most by a margin of about 3 percent. This study found that not only have all institution types seen an large increase in percent of major programs requiring a Senior Seminar, National Liberal Arts Colleges now have the highest percent, 32.63%. All other institution types are close in percent, with the exception of National Universities which this study has

found to have the lowest percent of major program requiring a Senior Seminar, at 11.3%.

Finally under this hypothesis, this study found that major programs in National Liberal Arts institutions require an Internship 3.86 percent of the time. Currently 3.85 percent of major programs in National Universities, 3.49 percent of programs in Regional Universities, and 1.75 percent of major programs in Regional Colleges require an Internship. In contrast, Siegfried and Wilkinson (1982) found that zero percent of National Universities, 0.9 percent of Regional Universities, and 3.8 percent of Regional Colleges, required an Internship.

2. across and within all institutions, there will have been an increase in the percent of programs requiring students do an internship, as compared to Siegfried and Wilkinson's (1982, p. 131-132) findings.
 - a. Finding: This study's data generally supports this hypothesis, with the exception of Regional Colleges. Since Siegfried and Wilkinson's (1982) study, the total percent of major programs requiring an internship 1.5 percent has grown, with this study finding of 3.5 percent of all major programs require an internship

As demand for formal work experience in the course of higher education has risen, each institution type has generally

increased the extent to which internships are required since Siegfried and Wilkinon's (1982) findings, with the exception of Regional Colleges. Regional Colleges saw a decline from 3.8 percent of economics major programs requiring an internship to 1.75 percent. This is somewhat notable, as Siegfried and Wilkinson (1982) report that at the time of their study no National Universities required an internship, only 0.9 percent of Regional Universities required an internship, and only 2.4 percent of National Liberal Arts Colleges required an internship. One wonders if the decline of Internships in Regional Colleges is due the category's size, or reflects real shifts in requirements.

Table 4

Siegfried and Wilkinson (1982) "Frequency of Special Requirements for Economics Major"

Requirement	All Institutions	Total Number of Respondents	Research	Doctorate	Comprehensive	Liberal Arts I	Liberal Arts II
Comprehensive Senior Exam (Oral or Written)	11.9	528	1.8	3.7	4	28.2	25.8
Independent Study Course or Project ^a	10	528	7.2	4	8.8	10.6	15.3
Senior Thesis	7.2	528	5.4	2	4.8	16.4	8.6
Distributional Requirement among Subfields of Economics	5.1	472	8	4.3	3.4	10.1	3.3
Specialization Requirement within a Subfield	4.3	463	4.3	4.3	3	11.2	1.1
Senior Seminar	2.5	528	3.6	2	2.2	3.5	1.9
Internship	1.5	528	0	0	0.9	2.4	3.8

Note. Will reach out to author and publisher for permission to use and publish.

^a This study breaks this variable into two; "independent Study" and "Capstone or Senior Project"

Table 15

Special Requirements in Economics Major Programs (No honors)^a

	Total	National Universities	Regional Universities	National Liberal Arts Colleges	Regional Colleges
Comprehensive Senior Exam (Oral or Written)	1.87	1.39	2.39	2.11	0
Independent Study ^b	1.15	0.99	0.74	1.4	5.26
Capstone or Senior Project ^b	14.4	13.72	15.07	15.79	7.02
Senior Thesis	6.43	3.78	4.41	15.44	1.75
Distributional Requirement among Subfields of Economics	4.1	5.17	3.31	4.21	1.75
Specialization Requirement within a Subfield	4.1	5.17	3.31	4.21	1.75
Senior Seminar	21.38	11.33	24.08	32.63	28.07
Internship	3.53	3.58	3.49	3.86	1.75
<i>N (major programs)</i>	1,389	503	544	285	57

Note. Table adapted from Siegfried and Wilkinson (1982), with the institution types differing in their 2017 *U.S. World and News Report* (2016) origin. The concept of "explicit" versus alternative", and breaking down "Principles of Economics" into All-in-One Intro Micro-Macro, Intro to Microeconomics, and Intro to Macroeconomics, are both novel to this study.

^a "No honors" refers to this table excluding all recorded "honors" economic major programs, so as to not inflate the number of programs counted relative to Petkus et al. (2014).

^b "Independent Study" and "Capstone" were a combined, or singular, variable in Siegfried and Wilkinson's (1982) study; This author felt that programs tended to distinguish between independent studies and senior projects, and further most senior project requirements are indistinguishable from capstone requirements, thus this study distinguishes accordingly.

Tertiary questions

Written as part of the proposal for this master's project, tertiary questions pertain to broad or miscellaneous questions, regarding the general population or the minimum number of credit hours required by economics major programs. As the population characteristics have been thoroughly addressed, their hypotheses shall be addressed only briefly, with this section's

analyses and discussion of findings focusing on credit hours. In this context, tertiary questions ask:

1. Are there more or fewer institutions offering economics major programs compared to the findings of Petkus et al. (2014, p. 57; see Table 1, Table 11, and Table 16)?

- i. Hypotheses:

1. More (greater than 792 institutions from the 2010 *U.S. News & World Report*) (Petkus et al., 2014, p. 57).

- a. Finding: This study's data support this hypothesis. There has been a net gain of 12 institutions offering an economics major program.

2. Are there more or fewer economics major programs, as a whole, compared to the findings of Petkus et al. (2014, p. 57; see Table 1, Table 11, and Table 16)?

- i. Hypothesis:

1. More (greater than 1,601) (Petkus et al., 2014, p. 57).

- a. Finding: This study's data does not support this hypothesis. There has been a net loss of 212 economics major programs.

3. How many economic major programs are offered on average within and across institution types (see Table 1 and Table 11)?

- i. Hypotheses:

1. there will be an average of two major programs offered within each institution and for all institutions, as Petkus et al. (2014) found.

- a. Finding: This study's data does not support this hypothesis. For all institutions, this study found the average number of

economics programs offered by an institution to have decreased from 2 to 1.73. Within institutions, Regional Universities saw the largest decline, from an average of 2.2 major programs per institution to 1.7 major programs per institution. National Universities had the second largest decline, from an average of 2.3 to an average of 1.98 programs offered per institution. Regional Colleges had the third largest decline, from an average of 1.3 to an average of 1.19 programs offered per institution. Finally, National Liberal Arts Colleges saw the smallest decline, from an average of 1.6 to an average of 1.57 programs per institution. While some changes are larger than others, as the likelihood of missed programs is small, and the impact of the omission of Honors programs seems relatively small in the preliminary findings, it seems likely that the data reflects a real decline in the number of economics major programs offered per institution.

4. Using Petkus et al.'s (2014, p. 59) formula for estimating the minimum number of credit hours required ($\# \text{courses} * 3 \text{crhr}$): for the economic core courses (and excluding special requirements), what does the distribution of credit hour requirements look like, in general and as compared to Petkus et al.'s (2014, p. 59) findings (see Table 5 and Table 14)?
 - a. Findings: An error in judgement that prevents this study's credit hour data to be compared to Petkus et al.'s (2014) data. As discussed, Petkus et al.'s (2014) study somewhat ambiguously reported on the minimal fulfilment of Foundations I,

Foundations II, Statistics, Econometrics, and Calculus courses, regardless of whether required by an economics program or another administrative unit. Additionally, Petkus et al. (2014) counted multiples of such requirements (i.e. some programs require several Calculus courses), which is only reflected in their estimates of credit hours (see Table 5). While this study intended to compare findings credit hours, it slipped the mind of the author that the maximum number of required economic core credit hours this study can present is 24 credit hours required (see Table 14). Petkus et al.'s (2014) data on credit hours reflects their decision to gather data on multiples of their six categories, and as such goes up to 40+ credit hours.

Further, this study examines credit hours in increments of three, allowing for some speculation regarding the minimal fulfilment of Foundations requirements. In contrast, Petkus et al.'s (2014) first credit hour category is 0-21 credit hours, and the remaining categories are in units of 6 credit hours (two required semesters). Thus, this study's data on credit hours is not comparable to Petkus et al.'s (2014) or previous studies due to method and mistaken expectations for analysis.

That being said, reporting in units of three credit hours was and is appropriate for this study's overall method and intent, and is surprisingly helpful in rounding out the findings thus far. Increments of three will be used in the future studies as the data on requirements and offerings of economics curricula expands. The analysis and findings concerning this study's credit hour data is as follows.

In Table 14, it can be seen that overall, the majority of economics major programs required at least between two to seven 3crhr semester courses (6-21crhr). Within that range, the bulk of major programs require between four to five 3crhr semester courses

(12-15crhr). Within the former, broader, range of 6-21crhr, Regional Colleges stands out in its' major programs requiring at most 15crhr, while about four to nine percent of all other major programs required 18-21crhr. This seems indicative of the smaller scale, and often aims, of economics major programs in Regional Colleges (Morse, 2009; Morse et al., 2017; see Table 7, Table 8, Table 9, and Table 10). Further, this corresponds to this study's finding that major programs in Regional Colleges are generally less likely to require all Foundations courses, and particularly Statistics and Calculus, both within and outside of a major program's own requirements.

Additionally, pertaining to the structure of Foundations I requirements by institution type (see Table 11, Table 12, and Table 13), it can be seen in Table 14 that major programs in Regional Colleges stand out in that they are most likely to require only two 3crhr courses (6crhr), most likely have no requirements (0crhr), and least likely to require only one course (3crhr). While it cannot account for the whole percent, the greater tendency of major programs in Regional Colleges to require only two courses (6crhr) reflects the fact that this study found all Regional College programs to require some form of both Intro to Microeconomics and Intro to Macroeconomics, but none required All-in-One Intro Micro-Macro. As Foundations II (Intermediate) requirements were less common among Regional College programs in comparison to other institution types, it seems likely that major programs in Regional Colleges are more likely than other institution types to require only Intro to Microeconomics and Intro to Macroeconomics.

Similarly regarding the structure of Foundations I requirements by institution type, National Liberal Arts Colleges stand out among the major programs requiring

only 9crhr of economic core courses at 14.7%; much higher than the other institution types (see Table 14). This likely reflects the larger proportion of major programs in National Liberal Arts Colleges requiring an All-in-One Intro Micro-Macro combined with requiring both Intermediate Microeconomics and Intermediate Macroeconomics (see Table 11 and Table 12).

The percent of major programs without any requirements (0crhr; see Table 14) lends important insights regarding differences between this study's methods and findings, and those of Petkus et al.'s (2014) methods and findings. As heavily discussed by this point, this study's findings for Foundations I and Foundations II requirements are fairly consistently around 10% lower than Petkus et al.'s (2014) findings (see Table 1, Table 11, Table 2, and Table 12). The general exception to this has been for Regional Colleges, which has been about 15% lower in this study for Foundations I and Foundations II in comparison to Petkus et al.'s (2014) findings.

In Table 14, the data on the percent of major programs without any requirements (0crhr) allows this study to account for the source of some of these differences. Specifically, each percent of major programs that had 0crhr of required economic core courses accounts directly for much of the differences between this study's findings and Petkus et al.'s (2014). However, as mentioned, there are three factors potentially influencing this study's general findings, particularly as compared to Petkus et al.'s (2014) study; methods, error, and actual program context and content.

Remaining to be seen, both after the completion of quality control and in the completion of Phase One, is the extent to which these three factors contribute to this study's general findings, and in particular their respective influence in the data on

0crhr major programs. However, some assumptions may be made regarding the 0crhr category, which when held allow for some speculation as to how much difference in methods, and to a much smaller extent error, may have contributed to the differences between this study's and Petkus et al.'s (2014) findings, both generally and in terms of credit hours. The first assumption is that, for the most part, this study's research design, supporting materials, and training processes for research assistants minimize the number and impact of errors made by research assistants, particularly relative to any impact methods may have had. Preliminary findings would, for the most part, seem to justify such an assumption, though certainly a proportion of 0crhr and general findings are impacted to a currently unknown, but likely minor, extent.

The second assumption is that few, if any, economics programs truly have 0crh of pre-requirements or requirements. Third, the programs that do not themselves require any given economics core course, in Explicit or Alternative forms, often exist within a set of departmental or institutional general education requirements that require at least one such course, particularly Foundations I and Statistics requirements, and occasionally Foundations II requirements. Fourth, it is assumed, that Petkus et al. (2014) went out of their way to collect and count courses from outside each economic major program's own stated requirements, thus explaining most of the differences between their findings and this study's.

Finally, in the context of these assumptions, it is assumed that between general education requirements outside a given a major program, and the major program's stated requirements, all or almost all 0crhr major programs of this study's preliminary findings require at least one Foundations I course, one Foundations II course, and at

least one Statistics course, but were omitted in accordance with this study's methods. However, unlike Foundations I and Foundations II requirements, this study's findings for Statistics requirements indicate that economic major programs are significantly less likely to have an Explicit, or for that matter Alternative, Statistics requirement. Instead Statistics seems far more likely to be a general education requirement outside of a major program's own requirements. Further, given the nature and size of differences between this study's findings for Statistics and Petkus et al.'s (2014), 0crhr programs, or for that matter error, almost certainly have a much smaller impact on these differences than methods.

For these reasons, the author feels it is reasonable to subtract the percent of major programs requiring 0crhr from each percent difference between this study's and Petkus et al.'s findings for Foundations I and Foundations II requirements (see Table 1 and 10), but not Statistics requirements, as an estimate of what this study's data might look like compared to Petkus et al.'s (2014) without such differences in method. Similarly, these adjustments are not applied to Calculus or Econometrics. The reasons being that Calculus is less likely to be a general education requirement outside of an economics major program, at least relative to Statistics, and Econometrics is almost always of a major program's requirements but also somewhat less common than Foundations I, Foundations II, or Statistics requirements (Petkus et al., 2014; see Table 1). In this context, the Foundations I and Foundations II findings are more likely directly impacted by the 0crhr programs, and the 0crhr programs presumably have much less an impact on this study's Statistics, Calculus, and

Econometrics requirements. For this reason Statistics, Calculus, and Econometrics are left out of the following adjusted estimates.

In this imperfect light, the differences between this study's findings and Petkus et al.'s (2014) findings would seem to shrink. This seems to further indicate that the discussed differences in methods have a large impact on reported Foundations I, Foundations II, and Statistics requirements. Subtracting the 7.42 percent of total major programs with 0crhr of requirements in Table 14, from the 10.2% difference between this study's total data on Principles requirements and Petkus et al.'s (2014) (see Table 1, Table 11, Table 2, and Table 12), the difference between the two studies' findings becomes 2.78 percent. Thus adjusted, the difference between this study's and Petkus et al.'s (2014) total data on Intermediate Microeconomics goes from 11.72% to 4.3 percent, and for Intermediate Macroeconomics goes from 8.71 percent to 1.29 percent.

The adjusted for 0crhr difference (-9.34 percent; see Table 14) between this study's and Petkus et al.'s (2014) data on Principles requirements for major programs in National Universities goes from 11.31% (see Table 1, Table 11, Table 2, and Table 12) to 1.97 percent. The difference between this study's and Petkus et al.'s (2014) National Universities data on Intermediate Microeconomics goes from 14.41% to 5.07 percent, and for Intermediate Macroeconomics goes from 11.72% to 2.38 percent. Major programs in Regional Universities and National Liberal Arts Colleges were the least likely to have 0crhr of requirements recorded, at 5.7 percent and 5.61 percent respectively.

In the context of this study's methods, this may indicate a stronger tendency of Regional Universities and National Liberal Arts Colleges to either have Explicit program requirements or readily available general education requirements. The adjusted for 0crhr difference (-5.7 percent; see Table 14) between this study's and Petkus et al.'s (2014) data on Principles requirements for major programs in Regional Universities goes from 9.56 percent (see Table 1, Table 11, Table 2, and Table 12) to 3.86 percent. The difference between this study's and Petkus et al.'s (2014) Regional Universities data on Intermediate Microeconomics goes from 11.65% to 5.95 percent, and for Intermediate Macroeconomics goes from 8.39 percent to 2.69 percent.

The adjusted for 0crhr difference (-5.61 percent; see Table 14) between this study's and Petkus et al.'s (2014) data on Principles requirements for major programs in National Liberal Arts Colleges goes from 8.07 percent (see Table 1, Table 11, Table 2, and Table 12) to 2.46 percent. The difference between this study's and Petkus et al.'s (2014) National Liberal Arts Colleges data on Intermediate Microeconomics goes from 7.13 percent to 1.52 percent. The difference between this study's and Petkus et al.'s (2014) National Liberal Arts Colleges data on Intermediate Macroeconomics goes from 4.03 percent to -1.58 percent, for an absolute difference of 1.58 percent. Like the other results, suggests this study's findings for Foundations I and Foundations II, while yet to be truly adjusted for differences in methods and errors in data collection, are generally very close to Petkus et al.'s (2014) findings.

The adjusted for 0crhr difference (-15.79%; see Table 14) between this study's and Petkus et al.'s (2014) data on Principles requirements for major programs in Regional Colleges goes from 17.54% (see Table 1, Table 11, Table 2, and Table 12)

to 1.75 percent. The difference between this study's and Petkus et al.'s (2014) Regional Colleges data on Intermediate Microeconomics goes from 15.73% to -0.06 percent for an absolute difference of 0.06 percent. For Intermediate Macroeconomics the difference goes from 12.48% to an absolute difference of 3.31 percent.

These adjustments do not truly change this study's initially discussed findings (see Table 11, Table 12, and Table 13). Rather, these adjustments reflect the assumption that few, if any, economics programs have no required credit hours. Further, these adjustments reflect the assumption that the programs this study reports as having 0crhr require, at least in general education requirements outside of a given economics major's own requirements, one Foundations I course, and likely also at least one Foundations II and one Statistics course, as per Petkus et al.'s (2014) findings in Table 1, and this author's experience. Finally, these adjustments also reflect the assumption that errors were minor, both as a whole and relative to the impact of such differences in methods.

This study's reported Alternative courses were generally small compared to Explicit course findings, and both Explicit courses on their own, and as combined with Alternative and reported in this study, yield findings close to Petkus et al.'s (2014). This indicates that this study generally did well at its goal of identifying the extent to which *economics major programs* require Foundations courses. This study's findings also seem to indicate that some courses are, across institution types, more likely than others to actually be directly required by an economics major program that could fulfill a Foundations requirement.

This means that some courses that can fulfill a Foundations requirement are often of general education requirements outside a major program, and thus are more easily missed under this study's approach. As a whole, five conclusions in the context of 0crhr programs and their impact on this study's findings seem reasonable. First, the differences between this study's findings and Petkus et al.'s (2014) findings are primarily due to differences in methods, as opposed to unresolved errors in data collection and analyses. Second, in the process of completing Phase One, most, if not all of the 0 crhr programs will be found to in fact in some way require at least 3-9crhr of Foundations courses. Third, most, if not all of the presumed 3-9crhr of requirements outside of a give major program will be, in order of likely hood, some combination of Foundations I, Statistics, and Foundations II courses.

Fourth, between methods and error, this study's findings indeed seem close to Petkus et al.'s (2014) findings concerning Foundations I and Foundations II, and likely ultimately are too for Statistics. Thus, fifth, there are also likely real shifts in requirements, perhaps within a margin of error within the adjusted differences just calculated from the 0crhr findings, which will become apparent when quality control and Phase One are complete.

Finally, for this section concerning credit hour findings, there is the 24crhr category (see Table 14). As a category, 24crhr is an outlier in that it means a major program was marked as having an Explicit or Alternative requirement for *all* economic core requirements, including All-in-One Intro Micro-Macro and both Intro to Microeconomics and Intro to Macroeconomics. In terms of findings, only one major program was found to require 24crhr, meaning it is likely marked "Data

Pending” with a note from a confused research assistant, to be handled when this study is reviewed and overhauled.

Table 5

Petkus et al.'s (2014) data on "Percentage of Economics Major Programs by Minimum Credit Hours in Economics Courses"

Number of credits	1950	All Majors	[National] Universities	Masters ^a	Liberal Arts	Baccalaureates ^b
0-21	32.3	10.6	8.7	10.5	14.8	10.3
22-27	24.6	35.7	31.6	35.6	44	35.3
28-33	27.7	39.2	41.7	40.4	32	36.8
34-39	10.8	13.1	16.1	11.9	9.3	17.6
40+	4.6	1.4	2	1.6	0	0
<i>N</i>	65	1601	554	688	291	68

Note. Will reach out to author and publisher for permission to use and publish.

^a *U.S. News* now calls "Regional Universities"

^b *U.S. News* now calls "Regional Colleges"

Table 14

Percentage of Economics Major Programs by Minimum Credit Hours Fulfilment of Economics Courses (No honors) ^a

Number of credits	Total	National Universities	Regional Universities	National Liberal Arts Colleges	Regional Colleges
0	7.42	9.34	5.7	5.61	15.79
3	0.86	0.4	1.47	0.7	0
6	5.98	3.38	7.72	5.26	15.79
9	7.85	4.57	7.72	14.74	3.51
12	30.89	27.24	33.82	30.18	38.6
15	34.7	37.97	34.38	31.23	26.32
18	6.55	8.35	4.96	7.72	0
21	5.69	8.75	4.04	4.56	0
24	0.07	0	0.18	0	0
<i>N (major programs)</i>	1,389	503	544	285	57

^a "No honors" refers to this table excluding all recorded "honors" economic major programs, so as to not inflate the number of programs counted relative to Petkus et al. (2014).

Conclusion

The existing data sets concerning the composition of the undergraduate economics curriculum are either outdated, feature validity threats, or are narrow or incomplete in their attempts to assess the composition and features of the undergraduate economics curriculum (Bosshardt et al., 2013; Brue, 1996; Dean & Dolan, 2012; Petkus, 2014; Scott & Siegfried, 1999; Siegfried, 2000; Siegfried & Bidani, 1992; Siegfried & Wilkinson, 1982; Sweeney et al., 1983; Taylor, 1950). In particular, they often fail to address or adequately reveal the extent to which, “practice conform[s] to principle” (Petkus et al., 2014, p. 56). Thus, the qualities and trends of the undergraduate economics curriculum are difficult to ascertain.

These facts are particularly concerning as the economics discipline and curricula have faced consistent challenges and criticisms for over a century, with the 2008 financial crisis calling attention these challenges and criticisms once again. The knowledge and beliefs of economists have profound implications the U.S. and for the world, yet little is known about the current practices of the undergraduate economics curricula. Further, current practices are based on ideals (Siegfried et al., 1991a; Siegfried et al. 1991b; Siegfried 2012) which could benefit from further critical examination, concerning things like how they came to be, how they are, how they can be, and what to do in these contexts.

This study, Study 1a, is the first of a series of studies, collectively embodying a multiphase mixed methods design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008). The overall objective of these studies is to explore and address a variety of issues and features of the discipline of economics. Central themes to be explored in the multiphase series relate to and represent past present and future factors of globalization,

education, citizenship, and society. This will be done by collecting and analyzing data on numerous aspects of the undergraduate economics curriculum, economics as a discipline, and economics as applied in the real world, via phases outlined in this study's methodology section.

The overall purpose of the multiphase research design begun and outlined in this study, Study 1a, is to inform ongoing debates concerning the future of the discipline of economics and how it is taught, by examining and creating paradigms and methods that may be of aide. Additionally these studies collectively aim to outline, and in small ways develop, potential technological and organizational solutions for detailed longitudinal curriculum tracking. The frameworks employed and developed in these studies may eventually be scaled and adapted for all sorts of curricula. Ideally, the completion of the multiphase studies' overall objective yields practical insights and tools that empower faculty, researchers, and the public, to better explore, discuss, create, improve, and apply economics and general curricula.

The purpose of this immediate qualitative study, Study 1a, is to conduct a census on the curriculum for population of undergraduate economics major programs in the U.S., primarily based upon the research designs of Petkus et al. (2014) and Siegfried and Wilkinson (1982). A software application was developed for data collection, which research assistants were trained to use, and which will be built upon throughout the multiphase studies. Descriptive statistics are used to provide a cursory analysis and summary of the data, both as collected and as compared to Petkus et al. (2014) and Siegfried and Wilkinson (1982). This study begins to update, and address gaps in, the processes, data, and analyses of undergraduate economics curriculum in the U.S., laying the foundation for the multiphase mixed methods research design (Creswell, 2012, pp. 534-576; Creswell & Plano-Clark, 2011; Plano-Clark & Creswell, 2008).

As discussed, Petkus et al.'s (2014) study did not give specify a number of methodological and procedural factors. To compensate, this study's research design utilizes novel processes of data collection and analyses that allow for a range of definitions and assumptions to be captured and portrayed. Several possible research designs that Petkus et al. (2014) may have utilized were posited, and one was deemed likely before data collection began. In master's project form, this study's procedures, analyses, questions, hypotheses, and thus findings, reflect these considerations and resulting assumptions.

Specifically, for reasons already discussed, it was assumed that Petkus et al. (2014) instructed research assistants to count all courses fulfilling a Foundations requirement, provided that they are readily visible on the webpage where a major program's requirements are found. Put another way, it was assumed that Petkus et al.'s (2014) research assistants were instructed not to go out of their way digging for requirements that fulfill a Foundations requirement but are not of the economics major's stated requirements, such as external general course requirements. Often the general education requirements of a department, college, or institution can fulfill a Foundations requirement, particularly either explicitly in title or in character of content.

However, such requirements are often listed in different location than the economics major requirements are to be found, and thus requires extra time and effort, sometimes significantly so, to ensure all additional requirements of students at an institution are located. This study is primarily interested in collecting data on the minimal fulfillment of Foundations requirements as required specifically by an economics program, referred to in the procedures as Explicit economic core requirements. However, this study was designed with the understanding that whether to include and how to categorize some required courses can be ambiguous, or for

that matter that the Explicit definitions of the procedures can be too strict. To ensure that key or possible data wasn't missed, this study collected data under less strict definitions as Alternative.

Specifically, if an Explicit Foundations course title is required by something other than the economics program (i.e. by department or institution), or when a requirement of any origin lacks an Explicit title but fulfills the spirit of a Foundations course, it counts as Alternative. Though in need of slight refinements, like adding discovered economics course titles that were not anticipated in the initial design, the use of Explicit variable designations in the data collection allows for a layer of data presumably of a stricter degree of accuracy and reliability. Alternative course requirements leave a little more license for interpretation to the research assistants collecting data. However, the primary factor influencing the degree to which Alternatives are counted and inflate the figures relative to the Explicit fulfilment of the Foundations, is the emphasis placed on identifying requirements outside an economics program.

Both attempting a close comparison of this study's data to Petkus et al.'s (2014) under the aforementioned assumptions, and to balance the needs and scope of this study/master's project, no big effort was made to collect data on requirements not of an economics program. If Alternative requirements, such as the general education requirements of a department, college, or institution, were readily visible as the data on the major's requirements was collected, they were counted. This study's research assistants were instructed not to go out of their way to gather data on requirements that were neither of the economics major's requirements, nor readily visible when identifying the economics major program's requirements.

Thus, in following the assumptions and preparing to compare results to Petkus et al.'s (2014) data, this study's reported findings are an aggregate of the strict (Explicit) and looser

(Alternative) fulfilment of Foundations requirements. Yet, as Alternative is not as expansively applied as it could be (i.e representing all requirements outside a given major program, even when not easily visible), it does not offer as high of an upper bound estimate as it could. In other words, data on Explicit requirements can be understood as a fairly consistent lower limit of the minimal fulfilment of Foundations requirements by economics majors. However, the true upper limit for the minimal satisfaction of Foundations requirements is established by including even the most obscure instances of Alternative requirements, and aggregating them with the Explicit.

On the topic of methods imposed bounds, it was assumed that Petkus et al. (2014) instructed research assistants not include Honors programs as economics major programs. While this study did count Honors programs, this study's presented findings omit Honors programs in order to match the assumptions posited to attempt a direct comparison to Petkus et al. (2014). This study identified and omitted 26 Honors programs, minimally impacting this study's findings.

The last assumption the hypotheses are based on is that the ideal economics curricula that Siegfried et al. (1991a; 1991b) and Siegfried (2012) outline, have indeed been broadly accepted as the standard, and thus will generally increase in practice over time. Thus, most of this study's hypotheses concerning the Foundations requirements predict an increase for each requirement. This assumption and accompanying hypotheses are also informed by Petkus et al. (2014) generally finding an increase in minimal fulfilment of Foundations requirements since Siegfried and Wilkinson (1982), with this study presuming to find this trend generally continued.

This study's procedures and findings indicate that some of the aforementioned assumptions concerning Petkus et al.'s (2014) methods were incorrect. There are consistent

patterns in the differences between this study's findings and Petkus et al.'s (2014) that seem to prove that Petkus et al. (2014) instructed their research assistants to hunt down and identify *all* economics, Statistics, and Calculus requirements. That is, Petkus et al.'s (2014) research assistants were likely instructed to dig for, identify, and count as data all instances of economics, Statistics, and Calculus requirements, regardless of whether required by the economics major specifically, or by a department, college, or institution.

Similarly, it would appear the assumption that Petkus et al.'s (2014) data did not include Honors programs may also have been wrong. This assumption is not as clearly incorrect, as this study only identified 26 Honors programs. However, if there was a variable that may have been difficult for research assistants to identify, causing errors, it would have been identifying Honors programs.

This, and the fact that Petkus et al. (2014) report a much higher percent of individual institutions offering more than four major programs than this study found, suggests that Petkus et al. (2014) likely included Honors programs. This leaves the question of whether there was a real reduction in the number of economics major programs relative to Petkus et al.'s (2014) findings. In sum, the underlying assumptions, and resulting differences in methods, are likely the main contributor to this study's data not supporting many of this study's operationalized hypotheses based on Petkus et al.'s (2014) study.

In this context, this immediate study, Study 1a, is concerned with three orders of questions. The primary questions seek to answer, to what extent are the Foundations courses from Siegfried et al.'s (1991a; 1991b) ideal economic core requirements for undergraduate economics majors, Foundations I (Intro to Microeconomics and Intro to Macroeconomics),

Foundations II (Intermediate Microeconomics and Intermediate Macroeconomics), and Foundations III (Statistics, Calculus, and Econometrics), minimally required by undergraduate economics major programs in the U.S. (see Table 1, Table 11, Table 2, Table 12, Table 3, and Table 13)? The secondary questions examine, to what extent are the courses Siegfried and Wilkinson (1982) call, “special requirements for the economics major” (p. 131-132), required by undergraduate economics major programs in the U.S. (see Table 4 and Table 15). Tertiary questions concern wanted, but also convenient, variables that were incidentally recorded, such as the number of credit hours per program (see Table 5 and Table 14).

Each of these broad questions has numerous operationalized sub questions and accompanying hypotheses. These operationalized sub questions and hypotheses are in the methods and findings. That being said, this study has three general hypotheses.

First, compared to Petkus et al.’s (2014) analysis of data from 2010 on the U.S. undergraduate economics curriculum, it is hypothesized that all institution types will have increased the degree to which they require Foundations courses (see Table 1, Table 11, Table 2, Table 12, Table 3, Table 13, Table 5, and Table 14). Second, it is hypothesized that Petkus et al.’s (2014) findings, that average course requirements of major programs within the Top 50 institutions of a given type will differ from those of the Remaining institutions, will hold (see Table 3 and Table 13). Third, regarding Siegfried and Wilkinson’s (1982) “special requirements” (p. 131-132), it is hypothesized that the percent of institutions requiring Special Requirements will have generally increased, with some Special Requirements being found to have increased more than others (see Table 4 and Table 15).

In comparison to Petkus et al.'s (2014) study (see Table 1, Table 2, and Table 3), this study's findings (see Table 11, Table 12, and Table 13) do *not* support the first general hypothesis, with only Econometrics requirements being found to have generally increased. The second general hypothesis is strongly supported, and numerous rank based differences not described by Petkus et al.'s (2014, p. 58; see Table 3) are explored based on data in Table 13. Rank related findings are notable as they consist of both a comparison to Petkus et al.'s (2014, p. 58; see Table 3) limited rank analysis, and the first rank analysis of all Foundations requirements for all four *U.S. News and World Report* institution types (see Table 13). Support for the third general hypothesis is mixed, with four Special requirements in Table 15 generally required less than in Siegfried and Wilkinson's (1982) findings in Table 4, three required more than in Siegfried and Wilkinson's (1982) study, and one new Special requirement assessed.

This study's general and operationalized questions and hypotheses were both created to guide exploration of the data, and based on specific assumptions of, and compensations for, Siegfried and Wilkinson's (1982), and particularly Petkus et al.'s (2014), methods and findings. For these reasons, the presence or lack of support for the general and operationalized hypotheses and questions is less important than their use as tools for exploring this study's data. Concerning the first general question and hypothesis, several findings are notable.

Between the columns of Table 1 and Table 11, the approximately 10% to 15% differences in the percent of programs requiring Foundations I and Foundations II courses seem attributable to differences in methods. This study's Statistics and Calculus findings are also exceptionally low compared to Petkus et al.'s (2014) data, but again these seem to primarily reflect differences in methods. In both cases, real differences and differences attributable to error

are overshadowed and muddled by the variations in requirements outside of a major's specified requirements

Specifically, it appears that a large amount of Petkus et al.'s (2014) data on Statistics and Calculus requirements in Table 1 likely reflects the general requirements of departments and institutions, rather than those of economics majors. It would also appear that around 10% to 15% of programs in this study may have been found lacking Foundations I and Foundations II requirements because such courses were listed in unseen department and institution requirements. In contrast, findings and comparisons of Econometrics requirements (see Table 1, Table 11, Table 3, and Table 13) are the least impacted by the differences in this study's and Petkus et al.'s (2014) methods.

This study captures data on all courses required by economics major programs that fulfill a Foundations requirement, and a little data on such courses when an economics major doesn't list it as required. Petkus et al.'s (2014) study appears to have extensively catalogued courses fulfilling Foundations requirements that are not of a given economics major's listed requirements. As Econometrics courses are virtually never required by a department or institution, aside from the possibility of error in data collection, it is safe to directly compare this study's Econometrics findings (see Table 11 and Table 13) to Petkus et al.'s (2014; see Table 1 and Table 3). In this context, this study found that across all institution types Econometrics requirements for economics major programs have increased in comparison to Petkus et al.'s (2014) findings (see Table 1, Table 11, Table 3, and Table 13).

Additionally, Regional Colleges generally have lower requirements than the other institution types. Principles requirements tend to be fulfilled either by programs requiring either

both Intro to Microeconomics and Intro to Macroeconomics, or only an All-in-One Intro to Micro-Macro course; data previously unavailable (see Table 1, Table 11, Table 2, and Table 12). Further, programs requiring only one semester of a Foundations I course almost always require an All-in-One Intro Micro-Macro course rather than one or both of Intro to Microeconomics and Intro to Macroeconomics (see Table 12). Numerous other, equally interesting institutional differences in Foundations requirements are detailed in findings concerning primary operationalized questions and hypotheses.

As it is divided by institution type, rank analysis of Foundations requirements occurs as part of the primary questions and hypotheses. This study's data on, and analysis of, Foundations requirements of economics majors as a function of institution rank, as seen in Table 13, is the most comprehensive to date. Before fully exploring Table 13, Petkus et al.'s (2014, p. 58; see Table 3) findings are compared to this study's, where it would seem that Econometrics requirements have generally increased in both Top 50 and Remaining National Universities and National Liberal Arts Colleges. Of greater interest, this study's exploration of the data in Table 13 shows that rank based differences are far more extensive than initially reported by Petkus et al. (2014, p. 58; see Table 3).

There are several findings concerning rank in Table 13. Though not always, generally economics majors in Top 50 institutions are more likely to require a given Foundations course than Remaining institutions. In the case of Principles (Foundations I) requirements, in the Total column of Table 13, and within National Universities and Regional Universities, programs in Remaining institutions were found to have greater Principles requirements than those in Top 50 institutions. Also concerning Foundations I requirements, though never over 40%, majors in Top

50 institutions are far more likely to only require an All-in-One Intro Micro-Macro course, as opposed to one or both Intro to Microeconomics and Intro to Macroeconomics.

Foundations II requirements are also similarly, if not more, mixed when it comes to programs in Top 50 or Remaining institutions having greater requirements, though in the case of Foundations II requirements, programs in Top 50 institutions tend to have greater requirements. Top 50 institutions generally have greater Foundations III requirements than Remaining institutions; only in the case of Econometrics requirements do major programs in Top 50 institutions always have greater requirements than programs in Remaining institutions. Finally, concerning rank findings, this study found the average number of economics majors offered per institution to differ by institution rank, something not previously reported on in published studies (see Table 13).

Support for the third general hypothesis is mixed. Specifically, the degree to which economics programs require a Comprehensive Senior Exam has gone down significantly, and Senior Thesis, Distributional, and Specialization requirements have fallen to a lesser extent (see Table 4 and Table 15). The degree to which economics majors require an internship has risen slightly and Capstones are also more frequently required. With an almost 20% increase in the degree to which it is required, Senior Seminars were found to be required far more often than in Siegfried and Wilkinson's (1982) study. Finally, this study reports Independent Study requirements as their own variable, finding them to be the least common Special requirement in Table 15.

In sum, there are several general findings First, had this study's methods matched those of Petkus et al.'s (2014) study, it is likely that this study's hypotheses would have been generally

supported, and that the differences in findings would shrink, except for Econometrics. Second, in spite of these differences in methods and findings, and the preliminary nature of these findings, this study's data is a close representation of what economics majors themselves require. Thus, while comparisons with Petkus et al.'s (2014) findings should be taken with a grain of salt, this study's data offers valuable, albeit preliminary, insights into the differences in Foundations requirements of economics majors by institution type and rank, as well as other useful data.

Finally, while this study achieved its goals of examining the degree to which economics major programs in the U.S. minimally require Foundations courses, due to time constraints, some miscalculations, lessons learned, methods need to be updated for a desirable level of detail. The data presented in this study is preliminary, as it needs to undergo a quality control process. However, more detailed curricula and course data is desired for the purposes of the overall multiphase mixed methods design.

For this reason, before proceeding with Phase One, the methods, software, and then the data, need to be updated. Updates include making it so course titles can be documented, so it can be known whether the course is required by the economics major program the department or the institution, and, for software application, generally readying it for the rest of Phase One. In late 2018 or early 2019, the Carnegie Classifications (Indiana University, n.d.) will update their classifications again and begin doing so every three years.

As an undergraduate economics majors take four years to complete, and their curricula tend to cycle their requirements and offerings in four year cohorts, synchronizing this census with the three year updates makes sense. If this study is considered a beta test, and the aforementioned updates are applied, this census could take place every three to six years,

synchronized with both the Carnegie Classification (Indiana University, n.d.) updates, and the resulting *U.S. News and World Report* (n.d.) updates. In this context, this study concludes by proposing this be considered a preliminary study or beta test in preparation for the new Carnegie Classification (n.d.) updates and more refined data collection and analysis.

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