

Arts Majors as Entrepreneurs and Innovators

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Abstract

This study examines the role of college graduates with degrees in the arts, STEM, and other creative fields as entrepreneurs and innovators in the United States' economy. As creativity is a trait of art students and is likely important for those acting as entrepreneurs and innovators in an economy, arts majors have the potential to play an important role in these areas. Using American Community Survey data, we look to identify arts, STEM, and other creative majors who are working in entrepreneurial occupations, those where self-employment is common, and innovative industries, those that are copyright-intensive. As it is possible that the nature of arts occupations may be inherently more entrepreneurial and innovative, we compare arts majors to STEM and other creative majors also likely to work in such occupations. Using logistic regression, we find that majoring in a core arts field more than doubles an individual's likelihood of working in an entrepreneurial occupation or an innovative industry relative to non-creative majors. Other creative majors, like communications and STEM majors, are also associated with an increased likelihood of working as entrepreneurs or innovators. Relative to STEM and other creative majors, majoring in a core arts field is associated with the greatest increase in the likelihood of working in an entrepreneurial occupation and third greatest increase in the likelihood of working in an innovative industry. While graduates of the arts play an important role in artistic creation, this paper also highlights a role for arts graduates as entrepreneurs and

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innovators in the U.S. economy. (Keywords: Entrepreneurship, Innovation, Arts, Arts Majors)

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1. Introduction

Innovation and entrepreneurship are terms that often come to mind when thinking about a healthy economy. Entrepreneurs create new businesses and business opportunities, and this has the potential to spur employment and economic growth (Fölster, 2000). Innovation, through the development of intellectual property, similarly has the potential to stir economic success (Park, 2010; Towse, Handke, and Stepan, 2008). As entrepreneurship involves generating new business ideas, and innovation involves generating new works of intellectual property, creativity is important in determining who achieves success as an entrepreneur or as an innovator (Kritikos, 2014). One group of college graduates who are thought to be creative or to have creativity as an integral part of their education and training are graduates with majors in the arts. As their role for entrepreneurship and innovation has not yet been studied, it is of interest to study their role in this regard.

Entrepreneurs and innovators are drivers of economic growth in large part due positive employment impacts that come with the creation of small businesses (Kritikos, 2014). In 2016, the United States had approximately 5.6 million employer firms. The vast majority of these firms were small businesses, with 89.0 percent employing fewer than 20 workers and 98.2 percent employing fewer than 100 workers. Small businesses contribute substantially to employment and the creation of intellectual property (“Facts & Data on Small Business and Entrepreneurship”, 2018). Firms employing a small number of employees are especially common within the arts and creative industries (Bujor and Avasilcai, 2014). Arts entrepreneurship and the promotion of the arts has increasingly been used as strategy by U.S. cities to spur economic development and revitalization, both to generate creative development and to attract other industries and high-skilled workers (Phillips, 2010).

To understand and identify what role arts majors play in entrepreneurship and innovation within the U.S. economy, we use American Community Survey (ACS) data. We explore descriptively and use regression analysis to assess the role of arts majors as entrepreneurs and innovators. We find considerable evidence for a role of arts majors as entrepreneurs and innovators in the U.S. economy. Arts majors are far more likely to be working in an entrepreneurial occupation or an innovative industry relative to college graduates as a whole. This evidence is supported using logistic regression analysis. While just under 20 percent of college graduates work in entrepreneurial occupations and just under ten percent work in innovative industries, we find that majoring in a core arts field more than doubles the likelihood of each relative to non-creative majors. Many STEM and other creative major groupings are also found to increase the likelihood of working in entrepreneurial occupations or innovative industries relative to non-creative majors.

We present findings for STEM and other creative major groupings in addition to findings for arts majors for two key reasons. First, STEM and other creative majors are likely to involve creative thinking and understanding the role graduates of these majors play in entrepreneurship and innovation holds value in itself. Second, the types of careers that arts graduates pursue may be intrinsically more entrepreneurial and innovative on average than those of college graduates generally. By comparing results for arts majors to results for STEM and other creative major groupings, majors whose graduates are also likely to pursue fields that are intrinsically more entrepreneurial and innovative, our findings that arts majors compare favorably to these fields in their likelihood of working in entrepreneurial occupations and innovative industries holds greater value.

The remainder of the paper will proceed as follows. Section 2 presents a review of the literature, first focusing on arts majors, then on entrepreneurship, then on self-employment, then on innovation. Section 3 presents data and descriptive statistics. We empirically define entrepreneurship and innovation in Section 4, and then proceed to describe the role that arts majors play in these areas. Section 5 presents the empirical methodology. Logistic regression results are presented in Section 6. Section 7 concludes.

2. Literature Review

As the focus of this work is to assess the role arts majors play as entrepreneurs and innovators in the U.S. economy, this review of the literature will proceed with a detailed discussion of four topics. This work adds to the literature on the careers of arts majors, so we begin with a detailed discussion of the literature surrounding the careers of arts majors. As our specific focus is on their role as entrepreneurs and innovators, we review separately literature surrounding the definition and empirical identification of these two concepts, as well as works identifying who plays these roles in economies. Due to the connection between entrepreneurship and self-employment, we also explore the theoretical and empirical work connecting these two issues. Last, we summarize the key takeaways of the literature sections and tie them to our study.

a. Careers of Arts Majors

This section of the review of the literature focuses on past work on the careers of arts majors. Such studies have either focused narrowly on a specific category of arts graduate or have looked generally at arts graduates as a whole.

Montgomery and Robinson (2003) and Ardrey (2009) both look to understand the careers of graduates with college degrees in dance. Montgomery and Robinson (2003) collect data

by surveying graduates of the Five College Dance Department³. Graduates surveyed span many graduating classes, allowing the authors to gain some understanding of the career trajectories of these graduates. The authors find that more than half the graduates were employed in dance at the time of the survey, and most had been employed in dance at some point following graduation. Recent graduates were significantly more likely to be employed in dance than non-recent graduates. Having pursued graduate studies in dance was also predictive of employment in dance. Ardrey (2009) used qualitative analysis to try to understand why those with dance degrees were not working in dance. Interviews with non-dancer dance graduates suggest that difficulty supporting oneself financially, as well as feeling unprepared for the financial realities of a career in dance contributed to not working in dance.

A series of studies by Stohs (1989, 1990, 1991a, 1991b, 1992a 1992b) look at graduates of the School of the Art Institute of Chicago. While much of this work was sociological and psychological, some aspects of the careers of these art graduates were analyzed. At 18 years after graduation, only six percent of fine arts majors were still supporting themselves financially in fine arts careers. Most had left the fine arts for careers in advertising, teaching, or a non-arts occupation. Differences between the careers of male and female graduates were also assessed.

A number of studies have looked at arts graduates generally using large scale surveys, which include the Strategic National Arts Alumni Project (SNAAP) survey⁴, the American

³ The Five College Dance Department consists of Amherst College, Mount Holyoke College, Smith College, University of Massachusetts at Amherst, and Hampshire College.

⁴ There are a few reasons to believe that results of studies using SNAAP data may not be representative of the population of arts majors, and likely differ from studies using ACS data. First, the arts programs studied using SNAAP are not all college level programs nor are they necessarily formal school programs. Second, SNAAP survey respondents are not a random sample of graduates. Institutions participate in the data collection voluntarily and are not likely to be a representative sample of arts training institutions. Institutions participating in this survey are primarily institutions of higher education (i.e., colleges, conservatories, and universities), as well as a small number of arts high schools.

Community Survey (ACS), and national surveys outside the United States. Lindemann et al. (2012), Lena et al. (2014), and Frenette and Dowd (2018) all use SNAAP survey data to analyze the career experience of arts graduates in the United States. Lindemann et al. (2012) find that more than half the arts graduates are employed in jobs associated with the arts. For those that are not, about 60 percent report that their training in the arts is either relevant or very relevant to their job. Over 60 percent of respondents had previously been or were currently self-employed, working freelance, or working as independent contractors. A small but not insignificant number of respondents had also founded companies. Lena et al. (2014) address a number of additional issues using the SNAAP data. One issue addressed is understanding why some respondents were not working as professional artists. Among recent graduates, the most common reasons for not working as professional artists were that artistic work was not available, they held higher paying or steadier jobs in other fields, and debt. For non-recent graduates, having a higher paying or steadier job was the most commonly selected reason, followed by artistic work not being available, and change in interests. Amongst those employed, the majority of arts graduates were either very satisfied or somewhat satisfied with their jobs. Gerber and Childress (2017) use SNAAP survey data to highlight the roles of arts graduates in teaching and serving other important functions in non-profit settings, emphasizing that measures of artistic creation may not present a holistic view of artistic contribution.

Wassall and Alper (2018) and BFAMFAPhD (2014) use American Community Survey data to study the occupations and earnings of arts graduates in the United States. Approximately 40 percent of working artists do not have any college degree, and the majority of college educated artists have a degree in a field outside the arts. Among arts graduates, a majority work in fields outside the arts. For those working in the arts, having a degree in the arts does lead to an

earnings premium. However, earnings for arts majors are low relative to college graduates generally.

Bille and Jensen (2018) and Frenette and Dowd (2018) look to understand which factors influence whether an individual is employed in the arts. Bille and Jensen (2018) use a national dataset from Denmark, looking at the subset of individuals who had ever been employed in an arts occupation. The primary finding of the paper is that for three of five groups of art occupations, having a college degree in an arts major is a significant predictor of remaining employed in the arts. Frenette and Dowd (2018) use SNAAP survey data to understand which factors predict employment in the arts, conditional on being an arts graduate. Amongst demographic factors, being male and being white are both positively predictive of employment in the arts. Within school-related factors, having a double major where an arts and non-arts major are paired decreases the likelihood of employment in the arts, while having a graduate degree in the arts increases this likelihood. Rengers (2002) looks at employment and earnings in two time periods for a sample of arts graduates in the Netherlands. Having a partner is found to increase the likelihood of being employed, while having children is found to decrease it. When looking at earnings in the second period, being employed in the first period has a large, positive impact on earnings in the second period.

b. Entrepreneurship/Entrepreneurs

What is entrepreneurship and who are the entrepreneurs who pursue it? These are both concepts without universally accepted definitions. In fact, the Center for American Entrepreneurship believes that 'Entrepreneurship is an elusive concept to pin down' ("What is Entrepreneurship?", n.d.). In part this is probably due to the fact that entrepreneurship is a

concept that is of interest and studied by a diverse range of disciplines with differing foci and differing vocabulary.

The dominant definition of the entrepreneurial process from economics probably extends from Schumpeter (Audretsch, 2003). He viewed entrepreneurship as a process that leads to disequilibrium in the marketplace rather than one that leads to equilibrium. His theory of ‘creative destruction’ is based on the idea that the entrepreneurial process leads to the establishment of new businesses because existing enterprises, especially large ones, tend to be resistant to change. A difficulty in defining the entrepreneurial process suggested by Audretsch (2003) is that it can, and certainly does in the arts, involve a variety of organizational structures. The entrepreneurial process can involve the activities of an individual, e.g., a painter, groups of individuals, e.g., a performing arts group, projects, e.g., the production of a movie, firms that are either for profit, e.g., an architecture firm, or not-for-profit, e.g., an art museum. Lazear states that entrepreneurship ‘is the process of assembling necessary factors of production consisting of human, physical, and information resources and doing so in an efficient manner’ (Lazear, 2005).

A universally accepted definition of entrepreneurs is in some ways just as complex and difficult to come up with as developing a universal definition of entrepreneurship but in other ways it may be much simpler. One of the most all-encompassing definitions comes from Dictionary.com: ‘Entrepreneurs, in the purest sense, are those who identify a need---any need--- and fill it. It’s a primordial urge, independent of product, service, industry or market’ (Nelson, 2012). A definition that’s more economics focused may be: ‘... a person, who through innovation and/or insight, adds value to a product or service and moves it to a higher level of economic return’ (Radich, 2014). Radich (2014) also notes that there are also social entrepreneurs who produce products or services that do not necessarily generate a higher level of economic return

but benefit various groups in society or society as a whole. These entrepreneurs can be found in government, education and politics, for example, where they innovate and take risks but create non-monetizable, but measurable, benefits from the products and services they produce. Taken collectively, entrepreneurship is a process of new creation, and entrepreneurs create. This creation involves generating new business ideas or filling market needs.

Defining entrepreneurs empirically is generally much simpler, and frequently revolves around self-employment (Christnacht, Smith, and Chenevert, 2018). Often times the empirical definition is determined by the available data and according to Blanchflower and Oswald (2007), ‘The most commonly studied class of entrepreneurs is those who are self-employed.’ This is especially true for studies that use large national samples of the labor force, rather than specialized, generally much smaller samples, of a select group. For example, Blanchflower and Oswald (2007) study self-employed entrepreneurs using the UK Labour Force Surveys of 2001-2007, the Canadian Labour Force Surveys of 2001-2005 and the U.S. Current Population Survey of 2001-2007. In a separate study of the U.S. self-employed entrepreneurs Blanchflower expands the definition to include entrepreneurs who own small firms (Blanchflower, 2007). To accomplish this he includes individuals who self-identified as being ‘(s)elf-employed in (their) own not incorporated business, professional practice, or farm’ along with those who self-identified as ‘(s)elf-employed in (their) own incorporated business, professional practice or farm.’⁵ An example of a much smaller sample is Lazear (2005) in which he studied entrepreneurs based on a sample of Stanford’s Graduate School of Business’s MBA alumni and who responded affirmatively to the question ‘I am among those who initially established the business.’

⁵ Both the ACS’s and the CPS’s variable, Class of Worker (COW), with the codes 6 for the former and 7 for the latter.

Woronkiewicz and Noonan (2019) provides a concise but thorough review of the empirical literature describing what is known about the basic determinants of the self-employed entrepreneurs. Discussed in the review are factors such as: education, labor market characteristics, family and individual financial matters, earnings, and demographic characteristics including age, gender, race and the presence of children. There are, of course, additional determinants discussed by others. Blanchflower and Oswald (2007) finds that having a self-employed parent is positively correlated with self-employment. Further, a study using Danish data finds that the genders of the parent and child matter in this relationship, specifically having a self-employed mother (father) has a larger effect on self-employment of females (males) (Hoffmann, Junge, and Malchow-Moller, 2015). A recent study by the Kauffman Foundation about early stage entrepreneurs in 2017 finds that the correlation between educational attainment and becoming a new entrepreneur is negative with the rate for high school dropouts being the highest and for college graduates the lowest. In addition, the Kauffman study finds that immigrants are twice as likely to become new entrepreneurs as native born (Fairlie, Desai, and Herrmann, 2019). Using a sample of U.S. residents with bachelors' degrees in the sciences, Kahn, La Mattina, and MacGarvie (2017) find an immigrant entrepreneurship premium in science-based entrepreneurship. Lazear, in his study of Stanford MBA graduates, finds that 'Entrepreneurs are individuals who are multifaceted. Although not necessarily superb at anything, entrepreneurs have to be sufficiently skilled in a variety of areas to put together the many ingredients required to create a successful business. As a result, entrepreneurs tend to be more balanced individuals' (Lazaer, 2005).

c. Self-Employed

Due to the entwined nature of self-employment and entrepreneurship in empirical studies, it is important to understand what it means to be self-employed. Szaban and Skrzek-Lubasinska (2018) classify the self-employed into five categories: dependent self-employed, hybrid self-employed, one-person replicative business owners, one-person innovative start-up owners, and freelancers/individual professionals. The dependent self-employed work under or provide services to one employer, functioning much like a normal employee, but are not formal employees. Hybrid self-employed have a permanent, stable employment contract with one firm but can work with other employers. One-person replicative business owners own small shops, restaurants, or other ventures but usually do not employ permanent employees. One-person innovative start-up owners own businesses but introduce a new product or service or are innovative in some other way. Freelancers are highly qualified and have skills that are in high demand, working on projects with different companies. These five groups of self-employed differ in their level of entrepreneurship. One person innovative start-up owners meet all but one of 33 characteristics of entrepreneurship. One-person business owners and freelancers also meet most characteristics, while hybrid self-employed and dependent self-employed meet fewer than half of the characteristics (Szaban and Skrzek-Lubasinska, 2018). Two factors that may determine the type of self-employment a person may engage in are educational status and the business cycle. Svaleryd (2015) finds that when the economy is strong, the highly skilled are pulled into self-employment, while weak economic conditions push the low-skilled into self-employment.

The theoretical link between self-employment and entrepreneurship has been tested empirically. An empirical study of the self-employed in Andalusia, Spain found that about 60 percent innovated or acted in an entrepreneurial way, and that the likelihood of innovating was

positively related to education (Plotnikova, Romero, and Martinez-Roman, 2016). An empirical study of German workers found that relative to non-self-employed workers, self-employed workers perform more tasks and those tasks performed require more skill (Lechmann and Schnabel, 2014).

d. Innovation/Innovators

What is innovation and who are the innovators that do it? Much like there is a challenge in defining entrepreneurship, defining innovation is comparably difficult. The Merriam-Webster dictionary defines innovation as ‘the introduction of something new’ or ‘a new idea, method, or device: novelty’ (“Innovation”, 2020). Just as entrepreneurship is a term that has different meanings across disciplines, so does innovation. Innovation is a topic of interest in economics, business and management, marketing, technology, science, and engineering, and more. This interdisciplinarity of innovation is a key factor in the difficulty of agreeing upon a universal definition of the term.

Baregheh, Rowley, and Sambrook (2009) look to present a multidisciplinary definition of innovation based on definitions collected from a variety of disciplines. In defining innovation, they gather around 60 definitions across seven academic disciplines. The authors then look to see what language these definitions have in common. When defining the nature of innovation, the word ‘new’ is far and above the most frequently used word, showing up more than once on average across these definitions. Change and improve are the second and third most frequently occurring terms regarding the nature of innovation. When defining the means of innovation, the terms idea, invention, technology, market, and creativity all occur at high frequencies. In defining the type of innovation, the terms product, service, process, and technical occur most

frequently. Taken collectively, innovations are new, changed, or improved products, services or processes, and the process of innovation involves generating ideas and being creative.

Empirically measuring innovation may come with fewer challenges than defining innovation does. Works of intellectual property (IP) are frequently used empirically as a measure of innovation (Teece, 2018; Park, 2010; Towse, Handke, and Stepan, 2008). Intellectual property law protects inventors of physical products through the awarding of patents, inventors of creative works through copyrights, and creators of brands through trademarks. Just as evidence suggests that immigrants play an important role in entrepreneurship in the U.S. economy, evidence suggests that immigrants play a role in innovation in the U.S. economy through the creation of patented inventions (Islam, Islam, and Nguyen, 2017). An alternative approach to empirically measuring innovation is the use of survey data. Siepel et al. (2016) uses the UK Innovation Survey, which asks firms about new products and new to market products, to empirically test theories of innovation. Using this survey, the authors find that firms that blend both artistic and scientific skillsets generate more innovation than firms that primarily draw from one skillset or the other (Siepel et al., 2016). While patents, copyrights, and trademarks may not exhaustively encompass all innovation that occurs within an economy, these do serve as a quantifiable starting point when trying to measure innovation.

e. Summary

Taken collectively, the literature on the careers of arts majors finds that a substantial number of graduates of arts fields work outside the arts, and many are self-employed. Arts majors must be working elsewhere in the economy, and the importance of creativity in both entrepreneurship and innovation make arts majors potential candidates to make contributions in these areas. In defining entrepreneurship and innovation empirically, it is common to relate self-

employment to entrepreneurship and intellectual property to innovation. While these are not perfect measures of these concepts, we will use these in creating our empirical definitions of entrepreneurship and innovation.

3. Data

a. The American Community Survey

The principal data source is the Census Bureau's American Community Survey (ACS)⁶. The ACS is an annual survey of U.S. residents that began after the completion of the 2000 Census. A unique random sample of households is chosen every year, so the samples can be appropriately weighted using Census population weights making it possible to combine ACS Public Use Micro Sample (PUMS) data from different years. We are using the combined 2013-2017 ACS PUMS as our primary source of data. Throughout most of our research we will concentrate only on respondents age 16 and over, since we are interested in labor force behavior. This subset contains observations on 12.9 million persons representing a weighted population of 255.8 million.

The primary reason the ACS is being utilized is that beginning with the 2009 survey it collected information about the major field of study from survey participants who are four-year college graduates. This information was never obtained from participants in prior Census or Current Population Surveys, nor from ACS participants prior to 2009. The ACS recognizes just over 150 majors. Also, the ACS PUMS contains up to two major codes for each college graduate. Thus, persons who reported being double majors are identified by both major codes. In addition, the size of the five year sample allows for reliable estimates for detailed majors.

⁶ For a detailed description of the American Community Survey, see <https://www.census.gov/programs-surveys/acs>.

There is no accepted set of undergraduate college majors that can be called arts majors so two definitions are utilized. The first grouping, the ‘core arts majors’, consists of nine majors⁷ that would likely be considered classic arts majors and are: fine arts; drama and theater arts; music; visual and performing arts; commercial art and graphic design; film, video and photographic arts; art history and criticism; studio arts; and miscellaneous fine arts. The architecture major⁸ is also included in this group primarily because architects are one of the National Endowment for the Art’s (NEA) arts occupations.

The second group, ‘extended arts majors’ encompasses: language and drama education; art and music education; English language and literature; and composition and speech. These four majors are less directly related to being an artist but, nevertheless, provide skills that would help graduates enter artistic fields.

b. Descriptive Statistics

Table 1 presents descriptive statistics for the sample of college graduates. The full sample of college graduates contains approximately 2.6 million observations. Using the sampling weights⁹ the population of college graduates is approximately 52.4 million. The first column presents results for the population of college graduates. The second and third columns present comparable averages for core arts majors and extended arts majors. Core arts majors comprise about 5.4 percent of the sample, while extended arts majors comprise about 4.3 percent of the sample¹⁰. Relative to college graduates as a whole, arts majors are less likely to be employed,

⁷ All the majors with the ACS code 6000 – 6099 for the variables FOD1P and FOD2P.

⁸ ACS major code 1401.

⁹ The ACS variable PERWT variable is used for frequency weights in all calculations.

¹⁰ As later analysis also includes STEM and other groups of creative majors, these groups are included in the table as well. Engineering majors have major codes 2400 – 2499. Science majors are 3600 – 3699, 4003, 4006, 4008, 5000 – 5008, and 5098. Social science majors are 4007, 5401, 5402, 5500, 5502 – 5507, 5599, 6402, and 6403. Business majors are 5501 and 6200 – 6299. Computer, math, and statistics majors are 2001 – 2107, 3700 – 3702, and 4005. Non-art education majors are 2300 – 2312, and 2399. Communication majors are 1901 – 1904.

more likely to be employed part-time, and have lower earned income conditional on being employed. Relative to core arts majors, the full group of arts majors are more likely to be employed and have higher earned income conditional on being employed. Self-employment is more common amongst arts majors than college graduates as a whole.

Table 1
Descriptive Statistics

Variable	Full Sample	Core Arts Majors	Extended Arts Majors
Employed	96.7%	95.5%	96.3%
Part-Time	15.2%	22.4%	21.3%
Self-Employed	10.2%	17.5%	11.3%
Earned Income	\$77,159	\$57,689	\$63,896
Male	49.6%	45.4%	34.9%
Age	43.4	41.7	44.8
White	79.5%	84.5%	86.9%
Black	9.0%	6.2%	6.4%
Asian	10.6%	8.7%	6.5%
Hispanic	7.9%	8.3%	5.8%
Married	61.7%	51.6%	57.7%
Masters or Higher	36.5%	26.9%	46.3%
New England Region	6.2%	6.8%	8.1%
Middle Atlantic Region	15.3%	19.2%	18.0%
East North Central Region	14.1%	12.5%	13.7%
West North Central Region	6.7%	5.6%	6.5%
South Atlantic Region	19.5%	16.2%	18.1%
East South Central Region	4.5%	3.3%	4.1%
West South Central Region	10.2%	7.7%	8.4%
Mountain Region	6.7%	6.6%	6.5%
Pacific Region	16.8%	22.1%	16.5%
All Core Arts Majors	5.4%		
Fine Arts	1.2%		
Commercial Art & Graphic Design	1.1%		
Music	0.9%		
Architecture	0.8%		
Drama and Theater Arts	0.5%		
Film, Video, and Photographic Arts	0.4%		
Art History	0.3%		
Studio Arts	0.2%		
Visual and Performing Arts	0.2%		
Miscellaneous Fine Arts	0.0%		
All Extended Arts Majors	4.3%		
English Lang., Literature, Composition, and Speech	3.3%		
Art and Music Education	0.6%		
Language and Drama Edu.	0.5%		
STEM and other Creative Majors	69.4%		
Engineering Majors	8.2%		
Science Majors	8.4%		
Social Science Majors	8.6%		
Business and Economics Majors	24.3%		

Computer, Math, and Stats Majors	5.6%		
Non-Art Education Majors	9.7%		
Communication Majors	4.6%		
Observations	2,617,082	141,758	119,128
Weight Total	52.4 M	2.8 M	2.3 M

Note: The sample is restricted to those who have graduated with at least a Bachelors' Degree and are in the labor force. Sampling weights are used in calculations.

Arts majors also differ significantly from the full sample of college graduates along many demographic characteristics. Relative to the full sample, core arts majors are less likely to be male and more likely to be white. While over 60 percent of the full sample is married, less than 52 percent of core arts majors and less than 58 percent of extended arts majors are. Core arts majors also differ considerably from the full sample in pursuing education beyond a bachelor's degree. While approximately 36.5 percent of the full sample have a higher degree, core arts majors are 30 percent less likely to have a higher degree. However, extended arts majors are more likely than the average college graduate to have a higher degree. Arts majors also vary from the full sample of college graduates in their regional distribution in the United States. Relative to the full sample of college graduates, core arts majors are more likely to live in New England, the Middle Atlantic region, and the Pacific region, and less likely to live elsewhere. This is not surprising, as these three regions contain some of the major U.S. cities and creative hubs, including New York City, Los Angeles, Boston, and Philadelphia.

The vast majority of arts major graduates do not go on to work directly in the arts. Wassall and Alper (2018) find that depending on the definition of what constitutes an 'arts' major, only between 15 and 25 percent of all arts majors work as artists in the United States. This finding is consistent with our data. Appendix Table A – 2 shows a breakdown of employment in the arts by occupational grouping. Approximately 23.9 percent of core arts majors work in arts and entertainment occupations, while 16.7 percent of all arts majors (core plus extended) work in

these occupations. When looking at the industries of arts graduates, Table A – 3 in the appendix shows that less than seven percent work in arts, entertainment, and recreation.

4. Entrepreneurship and Innovation

a. Entrepreneurship

Following the literature on entrepreneurship, the empirical definition we will use to examine the relationship between arts majors and entrepreneurship is that self-employed individuals are, by definition, entrepreneurs. In the ACS self-employed workers can be identified by the ‘Class of Worker’ (COW) variable.¹¹

The ACS reports on 539 unique occupations and places them into 23 major occupation groups.¹² To be included as an entrepreneurial occupation a cutoff that at least 20¹³ percent of those working in it being self-employed is used. This left 84 four digit ACS occupations¹⁴ with the ‘farmers, ranchers and other agricultural managers’ having the highest percentage self-employed at 84 percent and the ‘electronic home entertainment equipment installers and repairers’ having the lowest at 20 percent. One of the top five entrepreneurial occupations, ‘artists and related workers’ with 60 percent self-employed, is in the ‘Artists and Entertainers’ major occupation group as is the ‘editors’ occupation, with only 20 percent self-employed. The

¹¹ While this variable distinguishes between workers who are self-employed owners of incorporated businesses, professional practices or farms from those who are owners of unincorporated businesses, professional practices and farms, the empirical definition used here does not make this distinction. The ACS questionnaire can be found at www2.census.gov/programs-surveys/acs/methodology/questionnaires/2019/quest19.pdf.

¹² For more information see ‘Industry and Occupation,’ www.census.gov/topics/employment/industry-occupation/about/occupation.html##targetText=This%20system%20consists%20of%20539,into%2023%20major%20occupational%20groups.

¹³ In the regression analysis that follows, using a cutoff of 15 percent or 25 percent yields similar results to that of a 20 percent cutoff.

¹⁴ See appendix Table A – 1 for a detailed list of the 84 entrepreneurial occupations and the 16 major occupation groups.

analysis that follows is based on the aggregation of these occupations into their appropriate major occupation groups, 16 of the 23 in the ACS.¹⁵

The following tables show the distribution of college graduates in the entrepreneurial occupations. Table 2a provides this information for the core art majors and the extended arts majors. Table 2b provides the same information for STEM majors and other creative majors.

Table 2a
Distribution of Arts Majors in Entrepreneurial Occupations

Entrepreneurial Occupation	Core Arts Majors	Extended Arts Majors	Core Arts Majors					
			Fine Art	Drama	Music	Visual and Performing Art	Graphic Design	Film, Video, and Photography
Manager	4.87%	2.90%	0.93%	0.37%	0.55%	0.08%	0.85%	0.28%
Business Operations	3.73%	3.65%	0.70%	0.46%	0.67%	0.07%	0.62%	0.23%
Finance	2.08%	2.77%	0.46%	0.16%	0.42%	0.05%	0.36%	0.11%
Computer	17.83%	6.30%	4.53%	0.68%	1.32%	0.41%	8.14%	1.24%
Legal	2.14%	8.69%	0.34%	0.37%	0.51%	0.06%	0.10%	0.14%
Educator	14.46%	9.36%	2.07%	1.36%	7.72%	1.39%	0.82%	0.32%
Arts and Entertainment	40.25%	9.09%	7.16%	2.43%	4.05%	0.64%	12.36%	3.27%
Medical	1.76%	2.36%	0.48%	0.19%	0.43%	0.11%	0.13%	0.07%
Cleaning Services	6.28%	2.96%	1.65%	0.29%	0.77%	0.06%	1.07%	0.18%
Personal Services	7.84%	4.80%	2.13%	1.18%	0.87%	0.42%	1.63%	0.48%
Sales	3.96%	3.43%	1.00%	0.37%	0.55%	0.08%	0.87%	0.25%
Farmers	3.57%	3.80%	1.43%	1.09%	0.40%	0.00%	0.34%	0.16%
Construction	8.53%	2.35%	2.55%	0.74%	0.78%	0.07%	1.26%	0.37%
Installers	7.26%	3.33%	1.27%	0.55%	3.21%	0.24%	0.68%	0.72%
Production	25.59%	4.45%	9.49%	1.52%	1.74%	0.69%	6.46%	0.90%
Transportation	4.22%	3.60%	1.01%	0.59%	0.67%	0.07%	0.72%	0.27%

Entrepreneurial Occupation	Core Arts Majors				Extended Arts Majors		
	Art History	Studio Arts	Misc. Fine Arts	Architecture	Language and Drama Ed.	Art and Music Ed.	Literature and Composition
Manager	0.22%	0.14%	0.03%	1.53%	0.17%	0.20%	2.53%
Business Operations	0.26%	0.10%	0.07%	0.61%	0.18%	0.15%	3.33%
Finance	0.17%	0.06%	0.01%	0.37%	0.20%	0.21%	2.36%
Computer	0.30%	0.93%	0.18%	0.66%	0.30%	0.33%	5.68%
Legal	0.36%	0.06%	0.03%	0.23%	0.14%	0.10%	8.45%

¹⁵ The 16 occupations are: managers; business operations specialists; financial specialists; computer occupations; legal; educators; artists and entertainers; medical occupations; cleaning service workers; personal service workers; sales workers; farming, fishing and forestry workers; construction workers; installers, maintenance and repair workers; production workers; and transportation workers.

Educator	0.47%	0.33%	0.05%	0.32%	1.23%	3.27%	4.91%
Arts and Entertainment	0.83%	1.14%	0.17%	9.26%	0.34%	1.29%	7.49%
Medical	0.15%	0.08%	0.01%	0.14%	0.12%	0.10%	2.15%
Cleaning Services	0.14%	0.30%	0.02%	1.92%	0.25%	0.36%	2.37%
Personal Services	0.47%	0.43%	0.09%	0.40%	0.66%	0.67%	3.49%
Sales	0.24%	0.13%	0.02%	0.58%	0.30%	0.27%	2.86%
Farmers	0.00%	0.17%	0.00%	0.00%	0.06%	2.16%	1.58%
Construction	0.15%	0.44%	0.04%	2.30%	0.18%	0.32%	1.85%
Installers	0.05%	0.30%	0.04%	0.44%	0.18%	1.70%	1.45%
Production	0.90%	2.30%	0.36%	2.06%	0.59%	1.23%	2.76%
Transportation	0.11%	0.10%	0.06%	0.63%	0.20%	0.22%	3.19%

Note: The percentages for core arts majors are the row sums of the core arts majors (fine art – architecture). The percentages for extended arts majors are the row sums of the extended arts majors (language and drama education – literature and composition).

Table 2b
Distribution of Non-Art Creative Majors in Entrepreneurial Occupations

Entrepreneurial Occupation	STEM Majors			Other Creative Majors		
	Computer	Engineering	Science	Communication	Non-Art Education	Social Science
Manager	3.98%	11.40%	5.75%	4.17%	4.64%	12.58%
Business Operations	8.50%	11.04%	7.32%	4.93%	3.42%	15.60%
Finance	3.71%	4.74%	3.81%	3.38%	3.30%	16.48%
Computer	22.62%	6.29%	4.65%	12.80%	1.70%	8.88%
Legal	2.06%	3.78%	4.77%	4.48%	1.95%	43.96%
Educator	4.00%	3.23%	7.13%	4.18%	18.50%	10.05%
Arts and Entertainment	4.12%	4.65%	3.18%	14.05%	3.14%	7.62%
Medical	1.77%	3.09%	49.55%	0.91%	2.23%	5.76%
Cleaning Services	3.41%	5.15%	6.48%	3.45%	11.08%	9.86%
Personal Services	2.53%	1.99%	6.14%	4.98%	16.22%	8.96%
Sales	3.52%	5.17%	4.92%	6.14%	5.84%	13.36%
Farmers	4.05%	5.41%	13.08%	0.64%	7.87%	12.87%
Construction	3.96%	14.99%	6.73%	3.07%	6.64%	9.87%
Installers	5.27%	19.11%	6.92%	3.75%	5.04%	6.85%
Production	3.73%	5.87%	5.95%	3.36%	9.32%	9.45%
Transportation	6.74%	10.46%	6.31%	3.99%	7.01%	14.14%

Not surprisingly, core art majors account for 40 percent of workers with bachelor's degrees in the entrepreneurial arts and entertainment occupations with a relatively large segment of these majors coming from graduates who majored in graphic design, architecture and fine arts. In addition, another ten percent of those who are artists and entertainers have degrees in the extended arts majors with those who graduated with a degree in literature or composition accounting for a large segment of this group (approximately 80 percent). Graduates with non-arts

majors account for a much smaller proportion of the workers in the arts and entertainment occupation, but perhaps not as small as might be expected. Computer majors, engineering majors and science majors each account for between three and almost five percent of the workers in this occupation. The communication majors are almost 15 percent and social science majors almost eight percent.

Core arts majors account for one-quarter of the college educated workers in the entrepreneurial production occupations. Graduates with a fine arts major accounted for almost 40 percent of these workers with graphic design majors accounting for 25 percent and studio arts majors for almost nine percent. This reflects the fact that the occupations that make up this group include those that are likely to be populated by craft artists including: jewelers and precious stone and metal workers; woodworkers; and etchers and engravers. The workers with an extended arts major account for about five percent of this entrepreneurial occupation group.

There are only two other entrepreneurial occupation groups in which core arts majors account for more than ten percent of the workers. These are computer occupations, which is only web developers, and educator occupations, which is the residual teachers occupation group.¹⁶ Entrepreneurial web developers are comprised of almost eighteen percent core arts majors with graphic design majors and fine arts majors accounting for a little more than eight percent and almost five percent of them, respectively. The literature and composition majors account for most of the extended arts majors who are entrepreneurial web developers and, in fact, account for even more than the fine arts majors. With regard to the STEM majors, computer majors¹⁷ account for almost one-quarter of the web developers. Almost 13 percent of

¹⁶ It doesn't include ACS occupation codes for postsecondary teachers, primary through high school teachers, preschool and kindergarten teachers, special education teachers or teacher assistants.

¹⁷ The ACS computer majors includes those who majored in: communication technologies; computer and information systems; computer programming; computer science; information science; computer administration;

the web developers are communication majors and another almost nine percent are social science majors.

Almost 15 percent of the workers who comprise the entrepreneurial educator occupation have a major in the core arts. Slightly more than half these majors completed an undergraduate music major. Only those with a fine arts major out of the remaining core arts majors accounted for more than two percent of the educators. The extended arts majors accounted for slightly more than nine percent of those who work as educators but, surprisingly, it's not the art and music education majors who account for the bulk of this group it's the literature and composition majors who do. They account for a little more than half the extended arts majors working in the entrepreneurial educator occupation. Interestingly, the STEM majors comprise more of the entrepreneurial educator occupation than core arts majors. The science majors account for seven percent, the computer major for four percent and the engineering majors slightly more than three percent of the workers in this occupation. Not surprisingly the non-art education majors account for close to 20 percent of those in this occupation while the social science majors comprise half that amount.

b. Innovation

Also following the literature, we empirically define innovation based on intellectual property (IP) creation. We define IP intensive industries as either copyright, patent, or trademark intensive based on a joint report of the Economics & Statistics Administration and the U.S. Patent and Trademark Office (Economics & Statistics Administration and U.S. Patent and Trademark Office, 2016). For our primary analysis presented here, we will focus on only those industries that are copyright-intensive. We do this for multiple reasons. First, while patents and

computer networking; mathematics; applied mathematics; statistics and decision science; and mathematics and computer science (double major). ACS field of degree codes: 2001-2107, 3700-3702, and 4005.

copyrights are innovative works directly, trademarks indirectly promote innovation through their ability to allow brands to build reputations and become recognizable to consumers. Second, while patents are innovative works, arts majors are unlikely to be directly involved in the creation of physical inventions. While we restrict our analysis to copyright-intensive industries, we do present results for patent and trademark intensive industries in Appendix Table A – 6.

The ACS reports just over 250 unique industries by North American Industry Classification System (NAICS) code. Thirteen of those industries are identified as copyright intensive. These industries include newspaper, periodical, book, and directory publishers; software publishers; motion picture and video industries; sound recording industries; radio and television broadcasting; cable and other subscription programming; other information services; specialized design services; computer systems design and related services; advertising and related services; other professional and technical services; performing arts companies, and independent artists, writers, and performers¹⁸ (Economics & Statistics Administration and U.S. Patent and Trademark Office, 2016). When looking at these industries is it important to note that some are newer than others, coming into relevance with the rise of the internet and the platform economy. A number of these industries are closely linked to artistic output. Approximately 8.2 percent of college graduates in our data work in one of the copyright-intensive industries.¹⁹

The following tables show the distribution of college graduates in the innovative copyright intensive industries. Table 3a provides this information for both the core arts majors and the extended arts majors. Table 3b provides the same information for STEM majors and some other creative majors.

¹⁸ The corresponding NAICS codes, respectively, are 5111, 5112, 5121, 5122, 5151, 5152, 5191, 5414, 5415, 5418, 5419, 7111, and 7115.

¹⁹ Appendix Table A – 4 gives a more detailed breakdown of the distribution of copyright workers across these industries in the ACS sample.

Table 3a
Distribution of Arts Majors in Innovative Industries

Copyright Industries	Core Arts Majors	Extended Arts Majors	Core Arts Majors					
			Fine Art	Drama	Music	Visual and Performing Art	Graphic Design	Film, Video, and Photography
Newspaper	8.71%	12.34%	2.65%	0.39%	0.57%	0.13%	3.43%	0.99%
Software	5.12%	3.26%	1.25%	0.41%	0.67%	0.14%	1.30%	0.43%
Movie and Video	30.24%	6.61%	5.22%	6.25%	2.15%	0.75%	2.47%	12.42%
Sound Recording	29.91%	7.99%	2.71%	2.40%	20.71%	0.87%	1.34%	1.20%
Radio/TV	9.01%	5.06%	1.73%	1.33%	1.02%	0.23%	1.46%	2.49%
Internet	7.20%	5.98%	1.35%	0.64%	0.91%	0.27%	1.98%	1.08%
Special Design	53.17%	3.72%	11.06%	1.32%	0.58%	0.51%	31.94%	1.04%
Computer Systems	3.60%	2.65%	0.80%	0.26%	0.58%	0.09%	1.01%	0.31%
Advertising	13.58%	6.29%	3.45%	0.84%	0.72%	0.36%	5.60%	1.23%
Other Prof. Services	14.77%	5.83%	3.59%	0.82%	0.84%	0.36%	2.63%	4.90%
Artists and Performers	30.61%	10.22%	6.47%	6.78%	9.94%	1.31%	1.93%	2.11%
Periodicals and Books	11.49%	16.49%	2.80%	0.92%	1.02%	0.20%	4.01%	1.30%
Other Info	5.73%	5.75%	1.05%	0.59%	0.50%	0.07%	1.31%	1.46%

Copyright Industries	Core Arts Majors				Extended Arts Majors		
	Art History	Studio Arts	Misc. Fine Arts	Architecture	Language and Drama Ed.	Art and Music Ed.	Literature and Composition
Newspaper	0.24%	0.27%	0.06%	0.28%	0.59%	0.37%	11.40%
Software	0.37%	0.07%	0.21%	0.37%	0.08%	0.08%	3.10%
Movie and Video	0.63%	0.48%	0.25%	0.72%	0.12%	0.31%	6.22%
Sound Recording	0.52%	0.25%	0.15%	0.58%	0.47%	1.29%	6.23%
Radio/TV	0.32%	0.16%	0.11%	0.33%	0.08%	0.30%	4.68%
Internet	0.31%	0.20%	0.12%	0.48%	0.09%	0.14%	5.76%
Special Design	1.43%	1.53%	0.24%	5.10%	0.14%	0.56%	3.05%
Computer Systems	0.14%	0.13%	0.07%	0.31%	0.11%	0.14%	2.40%
Advertising	0.70%	0.51%	0.10%	0.47%	0.18%	0.13%	5.98%
Other Prof. Services	0.62%	0.74%	0.14%	0.74%	0.32%	0.38%	5.14%
Artists and Performers	0.83%	1.26%	0.33%	0.55%	0.44%	1.67%	8.15%
Periodicals and Books	0.68%	0.57%	0.08%	0.35%	0.60%	0.35%	15.55%
Other Info	0.21%	0.18%	0.00%	0.38%	0.40%	0.06%	5.29%

Note: The percentages for core arts majors are the row sums of the core arts majors (fine art – architecture). The percentages for extended arts majors are the row sums of the extended arts majors (language and drama education – literature and composition). The abbreviated copyright industry names can be found in full in the text.

Table 3b
Distribution of Non-Art Creative Majors in Innovative Industries

Copyright Industries	STEM Majors			Other Creative Majors		
	Computer	Engineering	Science	Communication	Non-Art Education	Social Science
Newspaper	3.86%	2.80%	2.78%	34.86%	3.71%	11.78%
Software	22.05%	18.38%	5.78%	5.71%	1.53%	9.83%
Movie and Video	6.78%	3.92%	2.69%	23.66%	1.85%	9.78%
Sound Recording	7.32%	5.39%	2.93%	13.96%	0.94%	8.73%
Radio/TV	8.19%	5.01%	2.88%	33.93%	2.16%	10.69%
Internet	21.66%	13.18%	5.15%	10.39%	1.63%	12.70%
Special Design	3.78%	4.51%	2.56%	6.53%	2.81%	6.10%
Computer Systems	29.11%	19.58%	5.93%	4.02%	1.57%	8.13%
Advertising	5.08%	2.72%	2.66%	25.74%	2.13%	11.62%
Other Prof. Services	5.51%	5.11%	5.89%	10.18%	4.29%	12.73%
Artists and Performers	3.05%	2.91%	3.84%	12.00%	4.16%	10.27%
Periodicals and Books	5.59%	3.14%	3.84%	16.29%	4.02%	12.87%
Other Info	15.70%	9.44%	5.25%	15.04%	1.48%	15.04%

College graduates with at least one of the core arts majors account for more than one quarter of all the college graduates who work in four of the thirteen copyright intensive industries. The greatest of which is the specialized design services industry (Special Design), where more than half of college graduates in this industry have a core arts major. This industry includes businesses that provide interior, industrial and graphic design services, but does not include businesses that provide architectural, engineering or computer system design services. Fully 60 percent (31.94% of the 53.17%) of the core arts majors who work in this industry are graphic design majors. The remainder of the art core majors working in this industry are primarily fine arts and architecture majors. The extended arts majors comprise less than four percent of the workers in the specialized design services industry. Similarly, none of the three STEM majors account for as much as five percent of the workers in this industry and none of the other creative majors account for as much as seven percent of the workers.

Core arts majors account for slightly more than 30 percent of the college graduates who work in the performing arts companies, and independent artists, writers, and performers (artists

and performers) industries which includes venues that produce or organize and promote live presentations involving the performances of actors and actresses, singers, dancers, musical groups and artists, and the independent (freelance) artists. Not surprisingly, music majors are one-third of these core arts majors while fine art majors and drama and theater arts majors each account for another 20 percent of them. In addition, the literature and composition majors, from the extended arts majors group, account for eight percent of the college graduates who work in these industries. The three STEM majors combined account for almost ten percent of those working in this industry group. College graduates who are workers in this industry with the three other creative majors comprise a little more than one-quarter of the college majors in the artists and performers industries with both the communication and social science majors accounting for more than ten percent each of these workers.

Another industry group in which the core arts majors account for 30 percent of the college graduates is the motion picture and video (movie and video) industries. This industry group includes businesses that are primarily engaged in the production and/or distribution of movies, videos, television programs, or commercials; in the showing of movies; or providing postproduction and related services. Film, video and photography majors account for 40 percent of the core arts majors working in this industry group. Drama and fine arts majors combined almost account for the same proportion of core arts majors in this industry. The literature and composition, apparently the writers, account for the vast majority of the extended arts majors in this industry group. The largest group of STEM majors who work in this industry are the computer majors, but they are less than seven percent of the college graduate workers. Almost one-quarter of those with college degrees who work in these industries are communication majors with another ten percent who are social science majors.

The fourth industry group where core arts majors account for 30 percent of the college educated workers is the sound recording industries group. This industry group includes businesses that produce and distribute musical recordings, that publish music, or that provide sound recording and related services. More than two-thirds of the core arts majors working in these industries are music majors. An additional twenty percent are accounted for by the fine arts majors and the drama majors. Fully three-quarters of the extended arts majors, who account for eight percent of the college graduates in this industry group, are literature and composition majors. None of the STEM majors account for as much as eight percent of the college graduate workers in this industry group. Among the other creative majors, the communication majors account for fourteen percent of the workers and the social science majors almost nine percent.

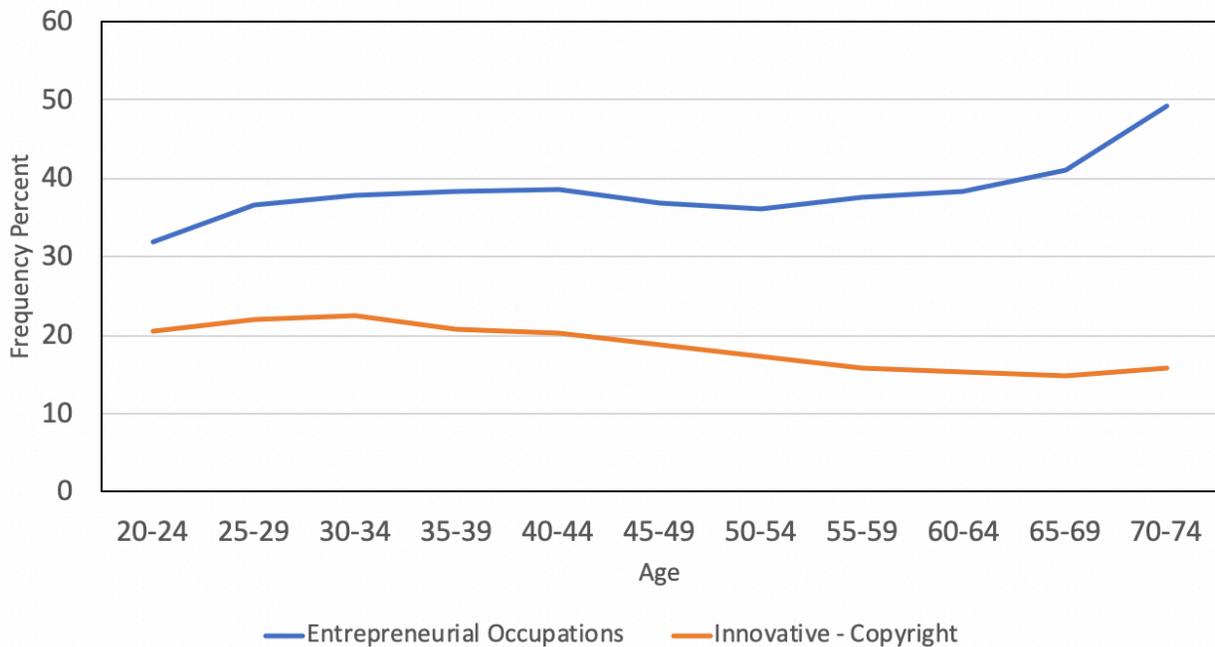
Of the remaining innovative industry groups, there are three groups, other professional and technical services (Other Prof. Services)²⁰, advertising and related services (Advertising) and periodical, book, and directory publishers (Periodicals and Books), in which core arts majors account for between ten and 15 percent of the workers with college degrees. In the remaining innovative copyright industries neither the core arts major nor the extended arts majors are well represented among the college graduates who work in them. However, some of the non-arts creative majors are well represented within these industries. Notably, computer, engineering, communication, and social science majors are well represented in a number of copyright intensive industries.

c. Artists as Entrepreneurs and Innovators Career Trajectories

²⁰ Other professional and technical service industries include businesses engaged in professional, scientific, and technical services excluding legal services; accounting, tax preparation, bookkeeping, and related services; architectural, engineering, and related services; specialized design services; computer systems design and related services; management, scientific, and technical consulting services; scientific research and development services; and advertising, public relations and related services. (ACS code 7490 or NAICS code 5419)

The prevalence of core arts majors in entrepreneurial occupations and innovative industries across age groupings is explored in Figure 1. This figure shows the percent of core arts majors employed in entrepreneurial occupations and innovative industries across five year age groupings. Just over 30 percent of core arts majors aged 20 to 24 are employed in entrepreneurial occupations. This number increases to almost 40 percent for those 30 to 45, falls among those 45 to 54, then increases steadily to almost 50 percent for those 70 to 74. Within the innovative industries, the percentage of artists employed starts at just over 20 percent for those aged 20 to 24, increases initially along age groupings, but then steadily decreases. Overall the figure suggests a substantial role for arts majors in these areas for all age groups, but notably in entrepreneurship for those late in their careers.

Figure 1: Core Arts Majors in Entrepreneurial Occupations and Innovative (Copyright) Industries



5. Empirical Methodology

The descriptive evidence presented thus far suggests a substantial role for arts majors as entrepreneurs and innovators within the economy. Specifically, large fractions of arts majors are employed in entrepreneurial occupations and copyright intensive industries. Logistic regressions will be used in the next section to complement the descriptive evidence previously presented. This will allow us to test for differences in the employment of arts majors in entrepreneurial occupations and innovative industries relative to STEM majors, other creative majors, and non-creative majors, holding constant a variety of demographic and employment related characteristics.

First, logistic regressions will be estimated with indicators for entrepreneurial employment as dependent variables. The estimating equation considered is

$$Entrepreneur_i = \beta_0 + \beta_1 CoreArts_i + \beta_2 ExtendedArts_i + \beta_M \mathbf{M}_i + \beta_D \mathbf{D}_i + \beta_E \mathbf{E}_i + \varepsilon_i$$

where *CoreArts* is a binary variable that takes on a value of one if the individual is in the group of core arts majors and *ExtendedArts* is a binary variable that takes on a value of one if the individual is in the group of extended arts majors. The vector \mathbf{M} is a group of binary variables indicating the various non-arts creative major groupings. Demographic controls, the vector \mathbf{D} , include age and age-squared, binary variables indicating married, white, black, Asian, Hispanic, and male, as well as an interaction of male and married. Employment related controls, the vector \mathbf{E} , include indicators for part-time employed and having a degree beyond a bachelor's degree, as well as regional indicators. Additionally, one regression controls for the occupational groupings as identified in Appendix Table A – 2.

A logistic regression will then be estimated with an indicator for employment in innovative industries as the dependent variable. The estimating equation to be considered is

$$Innovator_i = \beta_0 + \beta_1 CoreArts_i + \beta_2 ExtendedArts_i + \beta_M \mathbf{M}_i + \beta_D \mathbf{D}_i + \beta_E \mathbf{E}_i + \gamma_i$$

where the independent variables generally mirror those in the entrepreneur regressions. Where the sets of regressions differ is that occupational groupings will not be used as controls in the innovator regression.

6. Results

Logistic regression results testing for the impact of being an arts major on employment in entrepreneurial occupations and innovative industries are presented in Table 4. In the first two regressions, the dependent variable is Entrepreneur. In the third regression, the dependent variable is Innovator. The coefficients presented in the Table 4 are marginal effects estimated at means.

Table 4
Logit Regression: Dependent Variables are Binaries for Whether or Not Employed in Entrepreneurial Occupation, Innovative Industry

Major Grouping	Entrepreneurial Occupation	Entrepreneurial Occupation	Innovative Industry
Core Arts Majors	0.220*** (0.000)	0.080*** (0.000)	0.139*** (0.000)
Extended Arts Majors	0.041*** (0.000)	0.020*** (0.000)	0.063*** (0.000)
Engineering	-0.049*** (0.000)	0.011*** (0.000)	0.042*** (0.000)
Science	0.084*** (0.000)	0.081*** (0.000)	-0.001*** (0.000)
Social Science	0.065*** (0.000)	0.023*** (0.000)	0.018*** (0.000)
Business and Economics	0.032*** (0.000)	0.025*** (0.000)	0.016*** (0.000)
Computer, Math, and Stats	-0.049*** (0.000)	0.007*** (0.000)	0.185*** (0.000)
Non-Art Education	-0.076*** (0.000)	-0.011*** (0.000)	-0.033*** (0.000)
Communication	0.086*** (0.000)	0.023*** (0.000)	0.153*** (0.000)
Demographic Controls	Yes	Yes	Yes
Occupational Grouping Indicators	No	Yes	No
Observations	2,533,410	2,533,410	2,533,410

Note: The sample is restricted to those who have graduated with at least a bachelor's degree, are in the labor force, and are employed. Demographic controls include age and age squared, and binary variables indicating being married, white, black, Asian, Hispanic, male, working part-time, and having higher than a bachelor's degree. Additionally, a male*married interaction is included, as are regional controls. Coefficient estimates reported are

marginal effects estimated at means. Standard errors are in parenthesis. Sampling weights are used in calculations. *** indicates $p < 0.01$.

Taken as a whole, the regression results suggest a substantial role for art majors as entrepreneurs and innovators. In the first specification, being a core arts major is associated with a 22.0 percentage point increase in employment in an entrepreneurial occupation relative to non-creative majors. As about 19.4 percent of the population of employed college graduates are employed in an entrepreneurial occupation, majoring in the core arts more than doubles this likelihood. While less substantial, majoring in an extended arts field increases the likelihood of employment in an entrepreneurial occupation by 4.1 percentage points. The impact of majoring in the core arts is also substantial in comparison to having a STEM or other creative major. Amongst other creative majors, the coefficient on communication majors is highest at 8.6 percentage points. Amongst STEM majors, the coefficient on science majors is highest at 8.4 percentage points. The second specification adds controls for broad occupational groupings. When adding these controls, the coefficient on core arts major falls to 8.0 percentage points. As such, about two-thirds of the impact of being a core arts major on entrepreneurship is due to an increased likelihood of being employed in an entrepreneurial occupation group, and one-third is due to an increased likelihood of entrepreneurship within occupational groupings.

The third specification tests for the impact of majoring in the arts on employment in innovative industries.²¹ Majoring in the core arts is associated with a 13.9 percentage point increase in employment in copyright intensive industries relative to non-creative majors. As about eight percent of all college graduates are employed in copyright intensive industries, core arts majors are more than twice as likely to be employed in these industries. While smaller, majoring in an extended arts field is associated with a 6.3 percentage point increases in the

²¹ Comparable results for employment in patent and trademark intensive industries are presented in the appendix.

likelihood of innovative employment. Although being an arts major is associated with a large impact relative to non-creative majors in the likelihood of employment in copyright intensive industries, two other groups of creative majors, computer, math, and stats majors at 18.5 percentage points and communication majors at 15.3 percentage points are even more likely to be employed in copyright intensive industries.

Not only does majoring in the arts increase a graduate's likelihood of working in an entrepreneurial occupation or innovative industry, it also increases their likelihood of succeeding in these areas. Appendix Table A – 5 presents results of a logistic regression where the dependent variable is an indicator for whether a worker has above average earnings in an entrepreneurial occupation or innovative industry. Of note are the positive and significant coefficients on the core and extended arts majors variables. These positive earnings impacts may also explain the motivation for arts majors to choose to work as entrepreneurs and innovators.

7. Conclusions

This paper looked to understand the role college graduates with majors in the arts play as entrepreneurs and innovators within the U.S. economy. As creativity is deeply intertwined with entrepreneurship and innovation, and a trait held by many arts graduates, we hypothesize that the potential role for arts majors in these areas is substantial. Using American Community Survey data, we test this hypothesis. We define entrepreneurial occupations as those where self-employment is common, and innovative industries as those that are copyright-intensive. Using these definitions, we identify a substantial role for arts majors in entrepreneurship and innovation. Descriptively and subsequently using regression analysis, we find that majoring in the arts more than doubles the likelihood an individual is working in an entrepreneurial occupation or innovative industry. We find that even when compared to STEM and other

creative majors, majors where graduates would also be inclined to work in entrepreneurial occupations or innovative industries, arts graduates compare favorably in their likelihood of working in these areas.

There are multiple reasons for which these findings are important. First, entrepreneurship and innovation are believed to be important for the health of an economy and having a better understanding of who is playing these roles can help to inform policy geared at promoting these areas. Almost 20 percent of college graduates work in entrepreneurial occupations and almost ten percent work in innovative industries. Of core arts majors working in innovative industries, nearly half work in professional, scientific, and technical services industries and more than a quarter work in information industries. While more than half the core arts majors working in entrepreneurial occupations work within arts, entertainment, and recreation, nearly 40 percent work in entrepreneurial occupations within management, education, and other fields. Second, student loan debt in the U.S. is large and rising, and many have pointed fingers at graduates of fields within which job prospects are bleak. Job prospects within the arts and entertainment are not great and, per Wassall and Alper (2018), the vast majority of arts graduates do not end up working in this area. While there is value in artistic creation itself, these findings suggest that even if graduates with arts majors cannot support themselves financially through artistic creation, there is value in majoring in these fields if the skills acquired are transferable in such a way that these graduates can work in entrepreneurship and innovation.

The findings of this work have important potential policy implications. As arts majors play an important role in entrepreneurship and innovation, and entrepreneurship and innovation are believed to be drivers of economic growth, these findings provide support for further investment in arts education. While our work focuses on the role of college graduates with

degrees in the arts, investment in art education at the primary and secondary levels is necessary as well. Without exposure to the arts at the primary and secondary levels it is unlikely that there would be a sufficient pipeline of students interested in majoring in the arts at the college level. Further, exposure at these earlier levels may also nurture creativity in students who do not ultimately pursue a college degree or a creative college field.

There is a growing body of work stressing the importance of entrepreneurship education within arts higher education programs, and the findings of this paper further justify this. Researchers in recent years have highlighted the importance of educating artists as entrepreneurs (Bridgstock, 2013; Pollard and Wilson, 2013) as well as provided guidance on how to do so (Hong, Essig, and Bridgstock, 2010; Toscher, 2019). In light of this research, there is evidence that entrepreneurship education in arts higher education is growing. An informal count of arts entrepreneurship courses in U.S. higher education in 2013 found 60 institutions offering a total of 83 courses (White, 2013), while a formal count in 2016 found this number had grown to 168 institutions with 372 unique offerings (Essig and Guevara, 2016). Even amongst the large share of those trained in the arts that go on to work in the public school system, evidence suggests that entrepreneurial training leads increased entrepreneurial activities in and outside the classroom (Hanson, 2019).

A final policy implication of this work is an emphasis on the importance of interdisciplinarity in higher education. Recent work studying firms in the United Kingdom has found significant economic returns to combining arts and science skills (Siepel et al., 2016). Works looking at the returns to double majoring similarly suggest economic returns to pairing arts skills with science and other skillsets (Del Rossi and Hersch, 2008; Alper and Wassall 2016). Our findings of significant percentages of arts majors working in entrepreneurial

occupations and innovative industries outside of the arts suggests this interdisciplinarity is valued in U.S. firms as well.

This work is limited in a number of ways. There are many ways in which one could define entrepreneurship and innovation and one can debate whether our way of defining these concepts is the best way. As such, our work may overstate or understate the role of arts majors as entrepreneurs and innovators within the U.S. economy. Our data is also limited in multiple ways. Notably, the American Community Survey lacks information related to the institution at which a college graduate studied. If art majors study at relatively stronger or weaker institutions, this may have an impact on where they ultimately work. Additionally, the ACS does not have variables which allow us to account for differences in intellectual and other abilities which are likely to impact the size of the effect of major of highest degree on those working in entrepreneurial occupations and innovative industries.

While our findings take an important first step in identifying the broad role that arts majors play as entrepreneurs and innovators in the U.S. economy, there are many important avenues for future research still to be explored. This analysis focuses on the country as a whole, while the size of the dataset could allow for an analysis at a more granular level. Notably there are major U.S. cities known as being hubs for technology and innovation, as well as cities known for being creative hubs. An understanding of where arts majors are most commonly playing the role as entrepreneurs and innovators, and how creative and innovative hubs may interact in determining this, could add value. Further, analyses of this nature looking at this issue outside the U.S. could be of value. Last, cost-benefit analyses helping to inform policymakers of where resources dedicated to the arts could be most efficiently targeted would be important, especially

in light of the economic crises experienced in the 21st century, notably the Great Recession and most recently the Coronavirus pandemic.

Works Cited

- Agrawal, Ajay, Christian Catalini, and Avi Goufarb. (2010). "Entrepreneurial Finance and the Flat-World Hypothesis: Evidence from Crowd-Funding Entrepreneurs in the Arts," Working Paper #10-08, www.NETinst.org.
- Alper, Neil and Gregory Wassall. (2016). "Double-Majoring in the Arts: Cohort and Related Effects," 19th International Conference on Cultural Economics.
- Ardrey, Janelle M. (2009). "Dance Challenge: A study of individual college educated dancers and the challenges they face in the dance industry," Drexel University Master's Thesis, 1-36.
- Audretsch, David B. (2003). "Entrepreneurship: A survey of the literature," Enterprise Directorate-General European Commission, Enterprise Papers No. 14.
- Baregheg, Anahita, Jennifer Rowley and Sally Sambrook. (2009). "Towards a multidisciplinary definition of innovation," *Management Decision*, 47(8): 1323-1339.
- Bridgstock, Ruth. (2012). "Not a dirty word: Arts entrepreneurship and higher education," *Arts & Humanities in Higher Education*, 12(2-3): 122-137.
- BFAMFAPhD. (2014). "Artists Report Back: A National Study on the Lives of Arts Graduates and Working Artists," Retrieved on November 7, 2019 from: <http://bfamfaphd.com/#artists-report-back>
- Bille, Trine and Søren Jensen. (2018). "Artistic Education Matters: Survival in the Arts Occupations," *Journal of Cultural Economics*, 42: 23-43.
- Blanchflower, David G. (2007). "Entrepreneurship in the United States," IZA Discussion Paper 3130, Institute of Labor Economics (IZA).

- Blanchflower, Davig G. and Andrew J. Oswald. (2007). "What Makes a Young Entrepreneur?" IZA Discussion Paper 3139.
- Blumberg, Boris and Gerard Pfann. (2015). "Roads Leading to Self-Employment: Comparing Transgenerational Entrepreneurs and Self-Made Start-Ups," IZA Discussion Paper 9155, [Institute of Labor Economics \(IZA\)](#).
- Bujor, Adriana and Silva Avasilcai. (2014). "Creative Entrepreneurship in Europe: A Framework of Analysis," Fascicle of Management and Technological Engineering, 1: 151-156.
- Christnacht, Cheridan, Smith, Adam, and Rebecca Chenevert. (2018). "Measuring Entrepreneurship in the American Community Survey: A Demographic and Occupational Profile of Self-Employed Workers," SEHSD Working Paper Number 2018-28: 1-27.
- Del Rossi, Alison F., and Joni Hersch. (2008). "Double your major, double your return?" *Economics of Education Review*, 27: 375-386.
- Desai, Sameeksha. (2017). "Measuring entrepreneurship: Type, motivation, and Growth," IZA World of Labor 2016. [Wol.iza.org/uploads/articles/327/pdfs/measurement-matters-entrepreneurship-type-motivation-and-growth.pdf](http://wol.iza.org/uploads/articles/327/pdfs/measurement-matters-entrepreneurship-type-motivation-and-growth.pdf)
- Economics & Statistics Administration and U.S. Patent and Trademark Office. (2016). "Intellectual Property and the U.S. Economy: 2016 Update." Retrieved from: <https://www.uspto.gov/sites/default/files/documents/IPandtheUSEconomySept2016.pdf>
- Eisenmadd, Thomas R. (2013). "Entrepreneurship: A Working Definition," *Harvard Business Review*.
- Essig, Linda, and Joanna Guevara. (2016). "A Landscape of Arts Entrepreneurship in US Higher Education," *Alliance for the Arts in Research Universities*: 1-67.

- Evans, David S., and Linda S. Leighton. (1989). "Some Empirical Aspects of Entrepreneurship," *The American Economic Review*, 79(3): 519-535.
- Facts & Data on Small Business and Entrepreneurship. (2018). Retrieved from:
<https://sbecouncil.org/about-us/facts-and-data/>
- [Fairlie, Robert, Desai, Sameeksha, and A.J. Herrmann. \(2019\). "2017 National Report on Early-Stage Entrepreneurship," *Kauffman Indicators of Entrepreneurship*: 1-32.](#)
- Fölster, Stefan. (2000). "Do Entrepreneurs Create Jobs?" *Small Business Economics*, 14:137-148.
- Frenette, Alexandre and Timothy J. Dowd. (2018), "Who Stays and Who Leaves? Arts Education and the Career Trajectories of Arts Alumni in the United States," *National Endowment for the Arts Working Paper* 1-67.
- Gerber, Alison and Clayton Childress. (2017). "The Economic World Obverse: Freedom through Markets after Arts Education," *American Behavioral Scientist*, 61: 1532-1554.
- Hanson, Josef. (2019). "Entrepreneurship Among Public School Arts Educators: The Case of Music Teachers in New York State," *Artivate: A Journal of Entrepreneurship in the Arts*, 8(1): 45-66.
- Hipple, Steven F. and Laurel A. Hammond. (2016). "Self-employment In The United States," U.S. Bureau of Labor Statistics, Spotlight on Statistics. www.bls.gov/spotlight/2016/self-employment-in-the-united-states/pdf/self-employment-in-the-united-states.pdf
- Hoffmann, Anders, Junge, Martin, and Nikolaj Malchow-Moller. (2015). "Running in the family: parental role models in entrepreneurship," *Small Business Economics*, 44: 79-104.

- Hong, Christina, Essig, Linda, and Ruth Bridgstock. (2010). "The Enterprising Artist and the Arts Entrepreneur: Emergent Pedagogies for New Disciplinary Habits of Mind," In book: Exploring More Signature Pedagogies, Publisher: Stylus, 68-81.
- Innovation (2020). Merriam-Webster.com Dictionary. Retrieved from: <https://www.merriam-webster.com/dictionary/innovation>
- Islam, Asadul, Faridul Islam and Chau Nguyen. (2017). "Skilled Immigration, Innovation, and the Wages of Native-Born Americans," Industrial Relations, 56(3): 459-488.
- Kahn, Shulamit, La Mattina, Giulia, and Megan J. MacGarvie. (2017). "'Misfits,' 'stars,' and immigrant entrepreneurship," Small Business Economics, 49: 533-557.
- Kauffman Foundation: Kansas City (indicators.kauffman.org/wp-content/uploads/sites/2/2019/02/2017-National-Report-on-Early-Stage-Entrepreneurship-February-20191.pdf)
- Kelley, Donna J., Abdul Ali, Candida Brush, Andrew Corgett, Phillip Kim, and Mahdi Majbouri. (2017). "Global Entrepreneurship Monitor 2016 United States Report," GEM, Babson College.
- Kritikos, Alexander S. (2014). "Entrepreneurs and their impact on jobs and economic growth," IZA World of Labor, 8: 1-10.
- Lazear, Edward P. (2005). "Entrepreneurship," Journal of Labor Economics, 23(4): 649-680.
- Lechmann, Daniel S. J., and Claus Schnabel. (2014). "Are the self-employed really jacks-of-all-trades? Testing the assumptions and implications of Lazear's theory of entrepreneurship with German data," Small Business Economics, 42: 59-76.
- Lena, Jennifer C., Sally Gaskill, Rebecca F. Houghton, Amber D. Lambert, Angie L. Miller and Steven J. Tepper. (2014). "Making It Work: The Education and Employment of Recent

- Arts Graduates, SNAAP Annual Report 2014,” Bloomington, IN: Center for Postsecondary Research, Indiana University, School of Education.
- Lindemann, Danielle J., Steven J. Tepper, Sally Gaskill, Scott D. Jones, George D. Kuh, Amber D. Lambert, Jennifer Lena, Angie L. Miller, Kendall Park, Ellen B. Rudolph, and Leah Vanderwerp. (2012). “Painting with Broader Strokes: Reassessing the Value of an Arts Education,” Bloomington, IN: Indiana University and Vanderbilt University, Strategic National Arts Alumni Project.
- Montgomery, Sarah and Michael Robinson. (1993). “What Becomes of Undergraduate Dance Majors?” *Journal of Cultural Economics*, 27: 57-71.
- Nelson, Brett. (2012). “The Real Definition Of Entrepreneur---And Why It Matters,” *Forbes*. Retrieved from: www.forbes.com/sites/brettnelson/2012/06/05/the-real-definition-of-entrepreneur-and-why-it-matters/#505bc1564456.
- Park, Walter G. (2010). “The Copyright Dilemma: Copyright Systems, Innovation, and Economic Development,” *Journal of International Affairs Editorial Board*, 64(1): 53-68.
- Phillips, Ronnie J. (2010). “Arts Entrepreneurship and Economic Development: Can Every City by “Austintacious”?” *Foundations and Trends in Entrepreneurship*, 6(4): 239-313.
- Plotnikova, Maria, Romero, Isidoro, and Juan A. Martinez-Roman. (2016). “Process innovation in small business: the self-employed as entrepreneurs,” *Small Business Economics*, 47: 939-954.
- Pollard, Vikki, and Emily Wilson. (2013). “The “Entrepreneurial Mindset” in Creative and Performing Arts Higher Education in Australia,” *Artivate: A Journal of Entrepreneurship in the Arts*, 3(1): 3-22.

- Radich, Anthony. (2014). "Arts Entrepreneurship Blogathon – Day 1," Retrieved from:
blog.westaf.org/2014/05/arts-entrepreneurship-blogathon-day-1.html.
- Rengers, Merjin. (2002). "Economic Lives of Artists: Studies into Careers and the Labour Market in the Cultural Sector" Utrecht: Utrecht University, Interuniversity Center for Social Science Theory and Methodology.
- Ricketts, Martin. (2005). "Theories of Entrepreneurship: Historical Development and Critical Assessment," Retrieved from:
www.researchgate.net/publication/288825439_Theories_of_Entrepreneurship_Historical_Development_and_Critical_Assessment
- Siepel, Josh, Camerani, Roberto, Pellegrino, Bagriele, and Monica Masucci. (2016). "The Fusion Effect: The Economics Returns to Combining Arts and Science Skills," A Report for Nesta: 1-30.
- Stohs, Joanne. (1989). "Factors Affecting the Career Patterns of Male Fine and Applied Artists," *Journal of Social Behavior and Personality* 4:327-346.
- Stohs, Joanne. (1990). "Young Adult Predictors and Midlife Outcomes of Male Fine Art Careers," *The Career Development Quarterly* 38:213-229.
- Stohs, Joanne. (1991a). "Young Adult Predictors and Midlife Outcomes of 'Starving Artists' Careers: A Longitudinal Study of Male Fine Artists," *Journal of Creative Behavior* 25:92-105.
- Stohs, Joanne. (1991b). "Moving Beyond Women's Career Choices: Factors Associated with Career Continuity Among Female Former Art Students," *Journal of Career Development* 18:123-138.

- Stohs, Joanne. (1992a). "Intrinsic Motivation and Sustained Art Activity Among Male Fine and Applied Artists," *Creativity Research Journal* 5:245-252.
- Stohs, Joanne. (1992b). "Career Patterns and Family Status of Women and Men Artists," *Career Development Quarterly* 40:223-233.
- Svaleryd, Helena. (2015). "Self-employment and the local business cycle," *Small Business Economics*, 44: 55-70.
- Szaban, Jolanta and Malgorzata Skrzek-Lubasinska. (2018). "Self-Employment and Entrepreneurship: A Theoretical Approach," *Central European Management Journal*, 26(2): 89-120.
- Taylor, Timothy. (2019). "Some Snapshots and Thoughts about US Entrepreneurship," *Conversable Economist*, conversableeconomist.blogspot.com/2019/02/some-snapshots-and-thoughts-about-us.html
- Teese, David J. (2018). "Profiting from innovation in the digital economy: Enabling technologies, standards, and licensing models in the wireless world," *Research Policy*, 47: 1367-1387.
- Toscher, Ben. (2019). "Entrepreneurial Learning in Arts Entrepreneurship Education: A Conceptual Framework," *Artivate: A Journal of Entrepreneurship in the Arts*, 8(1): 3-22.
- Towse, Ruth, Christian Handke, and Paul Stepan. (2008). "The Economics of Copyright Law: A Stockpile of the Literature," *Review of Economic Research on Copyright Issues* 5(1):1-22.
- Wassall, Gregory and Neil Alper (2018). "The Importance of a College Major in the Arts to Artistic Success," *National Endowment for the Arts Working Paper*.

What is Entrepreneurship? (n.d.). Retrieved from: www.startupusa.org/what-is-entrepreneurship/.

White, Jason C. (2013). “Barriers to Recognizing Arts Entrepreneurship Education as Essential to Professional Arts Training,” *Artivate: A Journal of Entrepreneurship in the Arts*, 2(3): 28-39.

Woronkowicz, Joanna and Douglas Noonan. (2019). “Who Goes Freelance? The Determinants of Self-Employment for Artists,” *Entrepreneurship Theory and Practice*, 43(4): 651-672.

Appendix

Table A – 1 Entrepreneurial/Self-Employed Occupations		
ACS Occupations	ACS Code	SELF-EMPLOYED
Managers		
Chief executives	10	29.31%
Farmers, ranchers, and other agricultural managers	205	83.50%
Construction managers	220	34.73%
Food service managers	310	22.08%
Property, real estate, and community association managers	410	28.02%
Business Operations Specialists		
Agents and business managers of artists, performers, and athletes	500	28.19%
Management analysts	710	36.36%
Financial Specialists		
Appraisers and assessors of real estate	810	41.43%
Personal financial advisors	850	23.54%
Tax preparers	940	24.14%
Computer Occupations		
Web developers	1030	22.46%
Legal		
Lawyers	2100	31.80%
Educators		
Other teachers and instructors	2340	20.61%
Artists and Entertainers		
Architects, except naval	1300	27.91%
Artists and related workers	2600	60.59%
Designers	2630	27.47%

Actors	2700	33.14%
Producers and directors	2710	23.81%
Dancers and choreographers	2740	26.13%
Musicians, singers, and related workers	2750	43.04%
Entertainers and performers, sports and related workers, all other	2760	48.52%
Announcers	2800	28.56%
Editors	2830	20.87%
Writers and authors	2850	45.98%
Miscellaneous media and communication workers	2860	27.78%
Photographers	2910	57.26%
Television, video, and movie camera ops. and editors	2920	33.51%
Medical		
Psychologists	1820	39.51%
Chiropractors	3000	71.24%
Dentists	3010	62.14%
Optometrists	3040	51.13%
Physicians and surgeons	3060	24.12%
Podiatrists	3120	57.93%
Veterinarians	3250	37.31%
Health diagnosing and treating practitioners, all other	3260	73.85%
Massage therapists	3630	48.85%
Cleaning Service Workers		
First-line supervisors of housekeeping and janitorial workers	4200	25.94%
First-line supervisors of landscaping, lawn service, and groundskeeping workers	4210	43.87%
Maids and housekeeping cleaners	4230	26.75%
Grounds maintenance workers	4250	26.30%
Personal Service Workers		
First-line supervisors of personal service workers	4320	36.96%
Animal trainers	4340	50.13%
Nonfarm animal caretakers	4350	28.75%
Morticians, undertakers, and funeral directors	4465	21.42%
Barbers	4500	58.40%
Hairdressers, hairstylists, and cosmetologists	4510	50.30%
Miscellaneous personal appearance workers	4520	32.82%
Childcare workers	4600	32.60%
Personal care and service workers, all other	4650	25.36%
Sales Workers		
First-line supervisors of non-retail sales workers	4710	21.03%
Insurance sales agents	4810	27.77%

Travel agents	4830	26.10%
Real estate brokers and sales agents	4920	57.59%
Door-to-door sales workers, news and street vendors, and related workers	4950	50.30%
Farming, Fishing and Forestry Workers		
Fishers and related fishing workers	6100	62.42%
Logging workers	6130	36.77%
Construction Workers		
First-line supervisors of construction trades and extraction workers	6200	23.84%
Brickmasons, blockmasons, and stonemasons	6220	24.88%
Carpenters	6230	36.75%
Carpet, floor, and tile installers and finishers	6240	40.53%
Construction laborers	6260	24.69%
Drywall installers, ceiling tile installers, and tapers	6330	27.62%
Painters, construction and maintenance	6420	36.39%
Plasterers and stucco masons	6460	21.90%
Fence erectors	6710	25.86%
Installers, Maintenance and Repair Workers		
Electronic home entertainment equipment installers and repairers	7120	20.03%
Automotive body and related repairers	7150	21.17%
Automotive glass installers and repairers	7160	25.78%
Automotive service technicians and mechanics	7200	20.34%
Small engine mechanics	7240	25.93%
Home appliance repairers	7320	34.92%
Precision instrument and equipment repairers	7430	21.36%
Locksmiths and safe repairers	7540	30.72%
Production Workers		
Shoe and leather workers and repairers	8330	32.63%
Tailors, dressmakers, and sewers	8350	42.80%
Upholsterers	8450	38.28%
Cabinetmakers and bench carpenters	8500	28.41%
Furniture finishers	8510	29.27%
Woodworkers, all other	8550	38.53%
Jewelers and precious stone and metal workers	8750	46.32%
Etchers and engravers	8910	25.00%
Molders, shapers, and casters, except metal and plastic	8920	23.69%
Transportation Workers		
Taxi drivers and chauffeurs	9140	30.99%
Dredge, excavating, and loading machine operators	9520	26.57%

Table A – 2
Occupational Groupings

Occupations	Full Sample	Core Arts Majors	All Arts Majors
Arts and Entertainment	3.7%	23.9%	16.7%
Building Maintenance	0.8%	0.9%	0.7%
Business Operations	4.8%	3.8%	4.2%
Community Service	3.6%	1.9%	2.6%
Computer and Math	5.7%	3.5%	3.1%
Construction	0.9%	1.3%	1.0%
Education	13.6%	13.8%	20.6%
Engineering	3.3%	1.5%	1.0%
Extraction	0.0%	0.0%	0.0%
Farming and Forestry	0.1%	0.1%	0.1%
Financial Services	4.8%	1.6%	1.8%
Food Preparation	1.5%	3.0%	2.5%
Health Care	10.3%	2.9%	3.3%
Health Care Support	0.8%	0.6%	0.6%
Installation and Repair	0.7%	0.6%	0.5%
Legal	2.5%	1.1%	2.9%
Life, Physical, and Social Sciences	1.7%	0.7%	0.6%
Management	16.7%	13.3%	13.3%
Office Administration	8.3%	8.9%	9.2%
Personal Care	1.9%	2.7%	2.4%
Production	1.3%	1.9%	1.5%
Protective Services	1.6%	0.7%	0.7%
Sales	8.9%	9.0%	8.5%
Transportation	1.6%	1.5%	1.3%
Weight Total	52.4 M	2.8 M	5.0 M

Note: The sample is restricted to those who have graduated with at least a Bachelors' Degree and are in the labor force. Sampling weights are used in calculations. For a detailed description of the specific occupations comprising the broad occupational categories, see https://usa.ipums.org/usa/volii/occ_acs.shtml.

Table A – 3
Industry Groupings

Industries	Full Sample	Core Arts Majors	All Arts Majors
Agriculture, Forestry, Fishing, and Hunting	0.6%	0.3%	0.3%
Mining, Quarrying, and Oil and Gas Extraction	0.4%	0.1%	0.1%
Utilities	0.8%	0.3%	0.3%
Construction	2.3%	2.9%	2.1%
Manufacturing	8.1%	6.0%	5.0%
Wholesale Trade	2.4%	2.0%	1.8%
Retail Trade	6.5%	9.6%	8.0%
Transportation and Warehousing	2.1%	1.6%	1.5%
Information	3.1%	6.1%	5.7%
Finance and Insurance	7.1%	3.4%	4.1%
Real Estate and Rental and Leasing	2.1%	2.2%	2.0%
Professional, Scientific, and Technical Services	13.7%	19.9%	16.5%
Management of Companies and Enterprises	0.2%	0.1%	0.1%
Administrative and Support and Waste Management and Remediation Services	2.5%	2.6%	2.5%
Educational Services	17.8%	16.8%	24.5%
Health Care and Social Assistance	15.9%	7.0%	7.9%
Arts, Entertainment, and Recreation	2.2%	6.9%	5.2%
Accommodation and Food Services	2.7%	4.3%	3.6%

Other Services (except Public Administration)	3.4%	4.5%	4.7%
Public Administration	6.0%	2.9%	3.5%
Weight Total	52.4 M	2.8 M	5.0 M

Note: The sample is restricted to those who have graduated with at least a Bachelors' Degree and are in the labor force. Sampling weights are used in calculations. For a detailed description of the specific industries that comprise the industry groupings, see <https://usa.ipums.org/usa/volii/ind2013.shtml>.

Table A – 4
Distribution of Workers Across Copyright Intensive Industries

Copyright Industries	Number of Workers	Percent of Copyright Workers
Computer Systems Design	1,740,074	43.2%
Performing Arts Companies and Independent Artists	417,633	10.4%
Advertising	360,100	8.9%
Radio/TV Broadcast and Cable	260,168	6.5%
Other Prof./Tech. Services	234,740	5.8%
Movie and Video	230,146	5.7%
Special Design Services	228,985	5.7%
Periodicals and Books	189,298	4.7%
Software Publishers	116,269	2.9%
Newspaper Publishers	100,133	2.5%
Internet Publishing	90,201	2.2%
Other Information Services	40,295	1.0%
Sound Recording Industries	18,576	0.5%

Table A – 5
Logit Regression: Dependent Variable is Binary for Whether or Not Earnings are Above Average within Entrepreneurial Occupations or Innovative Industries

Major Grouping	Above Average Earnings – Entrepreneurial Occupations	Above Average Earnings – Innovative Industries
Core Arts Majors	0.047*** (0.001)	0.007*** (0.001)
Extended Arts Majors	0.009*** (0.001)	0.008*** (0.001)
Engineering	0.056*** (0.001)	0.084*** (0.001)
Science	0.023*** (0.001)	0.037*** (0.001)
Social Science	-0.015*** (0.001)	0.042*** (0.001)
Business and Economics	-0.003*** (0.001)	0.049*** (0.001)
Computer, Math, and Stats	0.041*** (0.001)	0.034*** (0.001)
Non-Art Education	0.014*** (0.001)	-0.049*** (0.002)
Communication	0.013*** (0.001)	0.016*** (0.001)
Demographic Controls	Yes	Yes
Observations	498,807	202,696

Note: The sample is restricted to those who have graduated with at least a Bachelors' Degree, are in the labor force, and are employed within an entrepreneurial occupation. The dependent variable is a binary variable indicating having an above average earned income for a worker in the worker's occupational grouping or industry. Demographic controls include age and age squared, and binary variables indicating being married, white, black,

Asian, Hispanic, male, working part-time, and having higher than a Bachelors' Degree. Additionally, a male*married interaction is included, as are regional controls. Coefficient estimates reported are marginal effects estimated at means. Standard errors are in parenthesis. Sampling weights are used in calculations. *** indicates $p < 0.01$.

Table A – 6
Logit Regression: Dependent Variable is Binary for Whether or Not Employed in an Innovative Industry

Major Grouping	Innovative Patent	Innovative Trademark
Core Arts Majors	-0.003*** (0.000)	0.031*** (0.000)
Extended Art Majors	-0.005*** (0.000)	-0.002*** (0.000)
Engineering	0.090*** (0.000)	0.087*** (0.000)
Science	0.039*** (0.000)	0.010*** (0.000)
Social Science	-0.005*** (0.000)	0.030*** (0.000)
Business and Economics	0.015*** (0.000)	0.118*** (0.000)
Computer, Math, and Stats	0.018*** (0.000)	0.049*** (0.000)
Non-Art Education	-0.016*** (0.000)	-0.121*** (0.000)
Communication	0.001*** (0.000)	0.154*** (0.000)
Demographic Controls	Yes	Yes
Observations	2,533,410	2,533,410

Note: The sample is restricted to those who have graduated with at least a Bachelors' Degree, are in the labor force, and are employed. Demographic controls include age and age squared, and binary variables indicating being married, white, black, Asian, Hispanic, male, working part-time, and having higher than a Bachelors' Degree. Additionally, a male*married interaction is included, as are regional controls. Coefficient estimates reported are marginal effects estimated at means. Standard errors are in parenthesis. Sampling weights are used in calculations. *** indicates $p < 0.01$.