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FROM THE EDITORS

Quarterly Review of Business Disciplines begins with the study of Donna Albano, Stockton University, and Jeffery C. Lolli and Angela M. Corbo of Widener University. They explore the importance of Sense of Place (SOP) in the branding of craft breweries and analyze how the message is communicated through each brewer's website. The research of Henrique Lyra Maia, FUCAPE Business School, and Dale Steinreich, Drury University, builds on earlier research by gathering more data and evaluating it considering the theoretical predictions made by Austrian Business Cycle Theory's main competing paradigm, monetarism. The result reveals that the critics had a valid point.

Kaye McKinzie, Brigid Appiah Otoo, and Samira Nichols, University of Central Arkansas, investigate whether one's sex impacts worker compensation in business colleges. They explore existing trends and offer prospects for the future. Dwane H. Dean, Frostburg State University, explores female hairstyles as an indicator of occupation, personality, desirability for hiring, etc. and makes recommendations to avert hiring bias. Joseph A. Mauro, University of Central Arkansas, examines the role of inequality of opportunity on regional economic growth in the United States. The study utilizes the data to determine the relationship of intergenerational mobility on per capita income.

Margaret A. Goralski, *Quinnipiac University,* Editor-in Chief
Charles A. Lubbers, *University of South Dakota,* Associate Editor

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CONTENTS

ARTICLES

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COMMUNICATING SENSE OF PLACE TO BUILD BRAND IDENTITY: AN ANALYSIS OF CRAFT BREWERY WEBSITES

Donna Albano, Stockton University

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ABSTRACT

This study evaluated and analyzed how eight craft breweries in Southern New Jersey communicated Sense of Place (SOP) to build brand identity through their websites. In the highly competitive market of craft breweries, many utilize their distinctive geographic identifiers to market their unique SOP to their customers. SOP can be described as the entire group of cognitions and affective sentiments held regarding a particular geographic locale (Altman & Low, 1992; Jorgensen & Stedman, 2001). In this study, SOP was evaluated through Gruenewald's (2003) Multidisciplinary Framework for Place Conscious Education (MFPCE), which details five indicators: perceptual, sociological, ideological, political, and ecological. A sixth indicator, temporal, was also added (Cavaliere, 2017). Additionally, an effective brand identity strategy informs, guides, and helps develop, nurture, and implement a business's overall branding strategy (Madhavaram et al., 2005). Brand identity activities ought to be significantly influenced by an in-depth understanding of, and appreciation for, an organization's unique SOP. Since a website is often used by a business as a comprehensive tool to communicate their unique products and services, the increasingly competitive online domain depends on a business's ability to orchestrate verbal and visual stimuli on product web pages to effectively convert page visitors into buyers (Schlosser et al., 2006). Only one of the eight breweries communicated SOP through all six indicators. Their website communication was comprehensive, descriptive, effective, and visually appealing. This model allows breweries to create interesting, memorable, and engaging website content that drives consumers to experience the place and product.

Keywords: Sense of Place, Craft Breweries, Brand Identity, Multidisciplinary Framework for Place Conscious Education (MFPCE), Website Communication

INTRODUCTION

The Craft Beverage Business is growing rapidly in the United States. While overall US beer volume sales in 2019 were down two percent, craft beer volume sales continued to grow at a rate of four percent. Additionally, craft beer retail sales increased six percent and accounted for over 25% of the overall US beer market in 2019 (Brewers Association, 2020). The Brewers Association (2020) defines craft breweries as having an annual production of fewer than six million barrels and at least 25 % of craft brewery ownership.

All 50 states and the District of Columbia now have craft breweries and with this rapid growth, the industry is becoming very competitive. These craft brewery businesses need to position

themselves differently from those in their competitive set. Through a differentiation strategy, a business can offer its consumers unique products and services which are distinctly different from its direct competition (Okumus, 2021). One of the ways craft breweries can differentiate themselves is through the use of distinctive geographic identifiers to market their unique Sense of Place (SOP) to their consumers. For example, including the names of the business and products, labeling that reflects their location or local ingredients used, and indigenous folklore and nostalgia to acknowledge the culture that shapes their business; all to create a bond with consumer's lifestyles, sense of community, and place attachments (Williams & Stewart, 1998).

SOP is a multifaceted concept that is derived from personal and interpersonal experiences, direct and indirect contact with an area, product or service, and cultural values and shared meanings (Farnum et al., 2005). Anholt (2009) refers to SOP as communicating location distinctive and memorable aspects that can be derived from a variety of place factors such as the physical and cultural environment, the products with which the place is associated, and the people. In this study, SOP is examined through Gruenewald's (2003) Multidisciplinary Framework for Place Conscious Education (MFPCE). Within the MFPCE, Gruenewald (2003) details five components that define this framework: (a) perceptual, (b) sociological, (c) ideological, (d) political, and (e) ecological. Cavaliere (2017) has contributed a sixth indicator, (f) temporal, resulting from empirical research involving agritourism and climate change in NJ. The six framework indicators served to structure the website analysis of this study and also serve as the structure in which the findings are reported.

Place branding and destination marketing can convey a destination's feel. Marketing and branding are important strategic tools to allow destinations to create their unique identity and to differentiate themselves from the competition (Phelan et al., 2019). Branding and positioning activities ought to be significantly influenced by an in-depth understanding of, and appreciation for, an organization's unique SOP. Additionally, an effective brand identity strategy informs, guides, and helps develop, nurture, and implement a business's overall branding strategy (Madhavaram et al., 2005). A website is a comprehensive tool that can be used by a business to communicate a unique brand identity. Websites are often used to communicate products and services and thus, the increasingly competitive online domain depends on a business's ability to coordinate verbal and visual stimuli on product web pages to effectively convert page visitors into buyers (Schlosser et al., 2006). The purpose of this study was to analyze how craft breweries communicated SOP to build brand identity through their websites. The study examined eight Southern New Jersey craft brewery websites using content analysis to evaluate how SOP is communicated to build brand identity.

LITERATURE REVIEW

Craft Beer/Breweries

Over 1,500 microbreweries opened across the country during the 1990s. This expansion of microbreweries stems from the desire of people to break away from mainstay brands. Microbreweries consciously sell and promote local culture, including historical photos, maps, and other artifacts that are the essence of a brewery's personality. Geographer Wes Flack has hypothesized that the growth of such establishments is a prime illustration of a movement termed

"neolocalism," in which people are attempting to reconnect with the local, the personal, and the unique (Schnell & Reese, 2003).

Beer in the United States has evolved over the past 30 years. Beer is now a sophisticated and complex beverage that spans many demographic categories. Beer encompasses different types (e.g. Ales and Lagers), styles (e.g. Amber Ale, Barley Wine, Hefeweizen, IPA, Pilsner, Stout), and varieties of styles. To date, the Brewers Association (2021) has classified more than 79 styles in 15 style families. Craft beer can be found everywhere from high-end country clubs to convenience stores. Beer is also the subject in several academic disciplines as researchers have used craft beer as a vehicle in which to explore many aspects of the social world (Withers, 2017).

Craft beer is independently brewed in a facility that does not produce more than six million barrels of beer per year (Brewers Association, 2020)**.** Craft beer starts from a combination of four main ingredients: water, malt, yeast, and hops. While craft beer is partially dependent on these ingredients, its uniqueness comes from the brewer and regionalism of beer-style varieties and additional ingredients. However, research shows that the complexity of beer is due to variances in geography. The location of breweries in the United States is closely tied to historical themes. Economic expansion, war, immigration, temperance/prohibition, politics, religion, transportation, and economic depression all shaped the beer brewing landscape from colonial times to the present (Batzli, 2014). The state of New Jersey (NJ) has 21 counties with varied histories, styles, communities, and cultures. Craft Beer is a beverage that brings people together to engage with local places. Whithers (2017) found it important to not only look at how products shape the local settings where they are produced and consumed, but also to evaluate how the region shapes the product.

Sense of Place (SOP)

While the notion of SOP has evolved, the scholarship in this area has grown considerably in recent years (Nelson, et.al., 2020). There is a lack of a common definition or understanding of SOP, both from the fact that it has become a catchphrase used to suit various purposes and from the interdisciplinary nature of the concept. The academic literature suggests that SOP is a multidimensional concept that extends beyond the physical attributes of a given location (Beidler, 2016).

SOP describes a wide range of connections between people and places that develops based on place meanings and attachment a person has for a particular setting (Rajala, et.al. 2020). Furthermore, while these meanings and attachments are often different based on a specific place, several common typologies have been identified in various research contexts, such as those place settings that focus on biophysical attributes, functional meaning related to actual or desired use, experiential meaning based on individual experiences, and interpersonal meaning that comes from social aspects of interactions with other individuals or the place (Rajala et al, 2020).

Place elements can include actions, emotions, experiences, intentions, and meanings. It is a person-to-place bond that can be defined interchangeably with terms such as place attachment, place meaning, and place identity, knowing that place can be defined in various ways affected by the scope of scholarly interest (Nelson, et al, 2020). The research synthesizes the notion of place as

place attachment (the emotional element) and place meaning. Scholars studying the concept of SOP examine the cognitive framework associated with place meaning and the descriptive narrative that captures the experience (Nelson et al., 2020). Place attachment is defined as a process and an outcome of bonding oneself to an important place" (Insch & Walters, 2018, p. 154). Place attachment may shape how consumers view destination image, destination attractiveness, personal involvement, and visitor satisfaction. The meaning of place changes over time and thus, relationships between place meaning and place attachment are dynamic. Someone's perception of place (place meaning) is constantly being reshaped as they are affected by varied experiences, social interactions, and dynamics. (Nelson, et.al., 2020).

Multidisciplinary Framework for Place Conscious Education (MFPCE)

MFPCE was selected and utilized in this study because it is useful in understanding sub-contexts of SOP. Gruenewald (2003) details five components that define this framework: (a) perceptual, (b) sociological, (c) ideological, (d) political, and (e) ecological. Cavaliere (2017) has contributed a sixth indicator, (f) temporal, resulting from empirical research involving agritourism and climate change in NJ. Gruenewald (2003) states "Places are fundamentally pedagogical because they are contexts for human perception and participation with the phenomenal, ecological, and cultural world. What we know is, in large part, shaped by the kinds of places we experience and the quality of attention we give them" (p. 645). Place is an inescapable aspect of daily life and is intimately linked to life experiences. Places provide the context in which individuals learn about themselves and make sense of and connect to their natural and cultural surroundings; shaping identities, relationships with others, and worldviews (Butler & Sinclair, 2020).

The first indicator of the MFPCE, perceptual, identifies specific elements that affect the five senses, including touch, taste, smell, sound, and sight. The second indicator, sociological, includes elements that communicate location, specifically mentioning claims of being "first" or the "only" as an identifier. The mention of folklore, gender, and nostalgia are also included. The third indicator, ideological, includes examining awards won and identifying larger connections with the world, gender and power, humor, colonialism, and the economy. The fourth indicator, political, includes examining all references to laws such as prohibition, age verification, occupancy as well as legislation, and geopolitical boundaries. The fifth indicator, ecological, identifies all references to agriculture and ingredients used in production and the elements including earth, wind, fire, land formations, weather, and seasons. The sixth indicator, temporal, identifies specific perceptions of seasonality and time in travel and transport.

Gruenewald (2003) explains that the problem is that human institutions, "such as corporations, have not demonstrated an orientation of care and consciousness toward the places that they manipulate, neglect, and destroy" (p. 622). Gruenewald (2003) applies the original MFPCE framework as a construct to examine perspectives on place that can advance theory, research, and education practice. Concerned about the lack of place-based education over state mandates and standardized testing, Gruenewald's (2003) MFPCE framework examines the relevance of place and supports the claim that educational research, theory, and practice need to pay more attention to places. Beyond education, place is a concept of growing interest in many fields, including architecture, ecology, geography, and business. Gruenewald (2003) posits "an understanding of place is key to understanding the nature of our relationships with each other and the world" (p.

622). Therefore, the selection and application of the MFPCE framework is well situated within this research context.

Brand Identity

The Southern NJ craft brewery experience offers homegrown ingredients in their beverages. The packaging and promotion associated with the breweries highlight landmarks, artifacts, and local features capturing SOP. This geographic region reaches different target audiences. Branding the SOP experience requires intentionality and strategy. Brand identity is the combination of images, graphics, and text used by a company to create a brand image. The brand reflects the company's mission, values, and interests through visual elements (Rukosuev, 2021).

Brand identity resonates with consumers as they connect the experience, memories, and product. Elizondo et al. (2016) refer to brand identity as a "mental construct" achieved through brand recognition and product interaction. They state:

> [B]rands become easily identifiable through the products and interactions, increasing brand awareness in consumers' minds which leads to brand attachment. However, embodying the brand's essence in products attributes is not an easy task. Far beyond a brand name or logo, there must be a clear understanding among design teams on what the brand stands for in order to achieve its translation into low-level multi-sensory attributes. (Elizondo et al., 2016, p. 101)

Brand identity interconnects with the MFPCE framework indicators as the shared emphasis on the "essence" of the product. SOP captures a multidimensional lived experience of the consumer's association with the local craft beer served in an intentionally designed local environment. The local culture is conveyed through artifacts, logos, designs, and any localized focal point. SOP provides a layered and interconnected framework to reinforce the brand identity through personal experience. Marcotte et al., (2011) stated "Whether considering local stakeholders or visitors to the area, it is necessary to ensure that they share the values and images promoted by area brands" (as cited in Lecompte et al, 2017, p.401).

SOP provides a paradigm to differentiate the product and space where consumers experience the brand (LeCompte et al, 2017). The consumer interacts with the brand through cognition and affect (Insch & Walters, 2018). Artifacts including menus, websites, social media, and décor reinforce the mission and values of the business. Hede and Watne (2013) state SOP is the connection between the brand's message strategy and consumer experience, as told through narrative and images. SOP humanizes (or personalizes) the experience and brand for other consumers (Hede & Watne, 2013).

SOP branding articulates the cultivated connection between the physical environment, social sphere, and cultural significance of the experience (Campelo et al., 2014). This identifies the constructs of time, landscape, ancestry, and community as the intersection between the physical and social environments (Campelo et al., 2014). They posit that SOP can be used as a strategic guide to create and re-create meaning within the social space through personal interaction.

Conveying the social experience and cultural richness of the brand through implicit and explicit strategies (Campelo et al., 2014) builds a framework that establishes expectations for the experience. "The experience of engagement and interaction requires presence (being in) and action (being with), always influenced by physical, historical, social, and cultural aspects that, together, contribute to creating a shared sense of meaning" (Campelo et al., 2014, p. 155).

Craft breweries in the Southern NJ region offer a unique appeal to local residents and visitors. Each brand can integrate the local culture into its product, packaging, and promotion. "For craft brewers, these relationships exist between individual breweries and their various stakeholders, including consumers, regulators, other brewers, etc." (Lee et al., 2017, p. 5). Relationship cultivation begins with a consumer's connection to the brand. Therefore, it is important to appreciate the nuances in place branding and place identity.

Place branding provides a glimpse into the brand's distinctive characteristics. LeCompte et al. (2017) identified three stages of place branding: a) promoting the attractiveness of the space to differentiate the brand; b) identifying the elements that promote a favorable appeal to diverse audience members within the target audience, and c) establishing action steps. Place branding demonstrates an intricate and intuitive understanding of the brand and the user experience with the brand.

A successful place branding promotion will identify core values and convey distinctive features of a brand in a way that resonates with new and returning consumers. Place brand articulates strengths and key attributes as a positioning tactic (LeCompte et al, 2017). They proposed a five-tier model noting the interconnectedness of SOP to place branding; positing touristic destination branding includes historical and cultural heritage; physical attributes of the place, social relations in the place, recreational activities in the place, and personal journey in the place (LeCompte et al, 2017).

Another branding tactic that connects the user experience and product is place identity which describes how the brand fits within a social setting (LeCompte et al, 2017). Hankinson (2004) identifies three elements that convey the culture of place as defining pillars: organized social spaces for gathering and interaction, differentiating symbolic elements that capture the local nuance of the brand, and subjective descriptors that express the sensation experienced within the environment (in LeCompte et al, 2017). Promoting brand identity is often accomplished through multiple communication channels. Websites are a common communication channel used to promote brand identity.

Communicating Brand Identity Through the Website

Storytelling and narratives are powerful tools to reinforce brand promotion (Hede &Watne, 2013). Promotional efforts often include an integrated marketing communication (IMC) campaign where "attempts to combine, integrate, and synergise elements of the communication mix…" (Luck & Moffatt, 2009, p. 317). The benefit of IMC is the intentional and congruent messaging that is conveyed on multiple communication channels. IMC campaigns build and sustain brand identity and brand equity (Luck & Moffatt, 2009).

Communication and marketing professionals strive to create "[m]arketing communication that represents the 'voice' of the brand" (Luck & Moffatt, 2009, p. 318). Consumers, especially digital natives, expect that brands live on an updated website. A brand's website presence tells a story about the product or service. Storytelling provides meaning to others who may be intrigued or motivated to experience the brand. "Narratives enable consumers to feel a connection or belonging with brands" (Hede & Watne, 2013, p. 209). Messaging resonates with consumers when the narrative creates an emotional connection and integrates the user experience for the target audience (LeCompte et al., 2017).

Websites provide a platform to promote brand identity through their logo, text, graphics, and images. Increasingly, to make a more informed decision, consumers are reviewing websites before purchasing or experiencing goods and services (Meintjes et al., 2011). Foroudi et al., (2019) found that consumers are more likely to engage in a brand when they find the website more visually favorable. Thus, a website reinforces brand identity through its visual presence and contributes to overall marketing success (Phillips et al., 2004).

> Corporate visual identity (CVI) is increasingly significant as a means of differentiation in today's economy that creates a corporate reputation. Undoubtedly, the two key elements that have a considerable impact on a company's corporate reputation are the company's logo and website. (Foroudi et al., 2019, p. 43)

Websites promoting brands intended for multiple target audiences need to provide appealing elements to capture the attention of different demographic groups. A well-designed website features the logo, pertinent information about the brand, photos, videos, social media handles, important announcements, and stories about people, place, and product. Mobile-friendly websites provide access to consumers who seek out their services. Technology has a distinct advantage as most mobile devices can directly connect to a phone number or click on an address for driving directions. The website is a key feature of an IMC campaign as it provides the bridge between promotion and relationship management (Luck & Moffatt, 2009). A website reaches multiple stakeholders such as investors, employees, loyal patrons, and new consumers. It is a valuable communication tool to build brand identity to multiple audiences through the website.

METHODOLOGY

Sample

A purposive sample of eight Southern NJ craft brewery websites, located in four counties, was selected as an intentional strategy to collect data. A "[p]urposive sample is a non-representative subset of some larger population and is constructed to serve a very specific need or purpose" (Rai & Thapa, 2015, p.6). The craft brewery websites were selected to represent a variety in size and offerings within these Southern NJ counties: 1) Atlantic including Hidden Sands and Somers Point Breweries, 2) Cape May including 7 Mile, Cape May, Ludlam, and Slacktide Breweries, 3) Cumberland including Glasstown Brewery, and 4) Ocean including Pinelands Brewery. A descriptive analysis of each brewery, as communicated through the website, will be described in greater detail in the results section.

Data Collection

The review of the eight websites resulted in a range of web content including multiple tabs of resources, links, text, images, and videos. From September to November 2020, each author collected data from the craft brewery websites on two different occasions as it related to modified MFPCE framework indicators. To address validity, the authors reviewed each website separately and independently. In January 2021, each author conducted the first phase of website analysis for a general overview to identify emerging research themes as related to the MFPCE framework indicators. In February 2021, the authors compared the results of the first analysis to further identify common themes with the MFPCE framework. In this phase, the authors identified applied examples that reflected the theoretical framework indicators for each brewery. The final review in January 2022 evaluated all eight websites searching for MFPCE framework indicators changes.

Data Analysis

The data were analyzed using the Content Analysis Method to determine how each of the eight breweries communicated, via their website, SOP through the MFPCE framework. Content Analysis is widely regarded by researchers as a flexible method for analyzing text (Cavanagh, 1997). This method can also be described as a group of analytical approaches that can range from impressionistic, intuitive, interpretive, to systematic strict analysis (Rosengren, 1981). Content Analysis also focuses on language characteristics as a communication tool with an emphasis on the contextual meaning of the content (Hsieh & Shannon, 2005). Additionally, this method is an effective and widely used research method that can systematically examine the communication content and performance of a website (Camprubí & Coromina, 2016; Krippendorff, 2004). More specifically, according to Law, et al. (2010), researchers often use the Content Analysis Method to analyze data on tourism and travel and visitor/hospitality-type websites.

Additionally, the Content Analysis Method is unobtrusive, unstructured, context-sensitive, and can address large quantities of data. Content Analysis examines the text, images, articles, and more of the web-based communication itself and not the individuals directly (Kim & Kuljis, 2010; Krippendorff, 2004). More importantly, since this study was done amid the COVID-19 Pandemic, Content Analysis was also the most effective research method to limit in-person contact during the research process. There are; however, some limitations to this research approach such as being devoid of a theoretical basis. The authors addressed this limitation by applying a theoretical framework that allows this contribution to focus on both what is perceivable and what is theoretically significant.

RESULTS

Overview

The MFPCE Indicators served as an effective framework to capture SOP as represented through the eight brewery websites. The results show the criteria evaluated for each website using overarching common themes, as related to the MFPCE framework. The six indicators provided a consistent measure to evaluate SOP. This section presents the common overarching themes found

in the content and communication among websites. The six framework indicators served to structure the research results for this study (see Table 1).

Table 1. MFPCE Framework Indicators: Themes, Examples, and Criteria

The MFPCE Framework Indicators provided a consistent model for data collection from the brewery websites.

MFPCE Framework Indicators	Emerging Research Themes	Examples	Criteria Evaluated
Perceptual	Interpretation and connection with information presented	Breweries named after geographic locale, name-branded beer, and labels.	Brewery names, beer names, and beer labels and logos
Sociological	Location and Firsts	First-ever first-place winner, first anniversary, New Jersey identified.	Elements that communicate the location of the brewery, specifically mentioning NJ, claims of being *first* or the *only* brewery as an identifier
	Identity/ Folklore	Ben Franklin reference, historical Millville identity	The mention of folklore and nostalgia were analyzed and reported in this dimension.
Ideological	Awards	Breweries identified awards won for their product.	Includes examining awards won and how they are communicated. The ideological indicator can examine any reference to being indigenous to the product, place, or process
	Larger connection with the world	Breweries communicated their beer production systems and capacities, had diagrams and pictures of events as well as their connection to sourcing and use of local ingredients	Identify or communicate any larger connection with the world, gender and power, humor, colonialism, or the economy.
Political	Age Verification	Brewery websites that identify age verification.	Examining all references to the laws that have impacted NJ craft breweries includes the drinking age.
	Regulations	Food, required tours, outside alcohol	New Jersey state brewery regulations regarding serving

			food, tours, and outside alcohol.
Ecological	Indigenous ingredients, fresh, local. Seasonality	Cranberries, Pine Barren needles, local coffee, and honey. Pictures, references, and ingredients connected to the four seasons	References to agricultural products including ingredients used in production, animal references. The elements include earth, wind, fire, weather, and seasons.
	Water	Water, the predominant ingredient in beer, referenced in sourcing and quality	The differentiating strategy of using natural and native ingredients grown and produced in NJ
	Geography	Use of land formation in brewery name or on website.	The shape of the state, geographic location, natural surroundings.
Temporal	Seasonality	Breweries appealing to summer, vacationing, outdoors.	Focuses on specific perceptions of seasonality and time in the travel and transport of food
	Time	Hours of operation, special events, holidays, and historical references about the origin of their businesses.	References to events, holidays, hours of operation and tours, age of operation, production, or historical references of the business were considered as related to the conceptualization of time

The eight Southern NJ craft breweries included in this study convey SOP through their website communication. Brand identity is promoted through distinctive images, graphics, and text that reinforce SOP through notions of place, experience, and cultural environment (Anholt, 2009). The results of this study capture how the craft breweries' websites communicated SOP through the MFPCE Framework Indicators. (See Table 2.)

Findings

This section focuses on the common themes discovered during the three phases of data analysis. The findings acknowledge craft brewery website content using the MFPCE Framework to communicate SOP to build brand identity. Table 2 depicts how each website portrays SOP through the individual MFPCE Framework Indicators. Further discussion and application follow the summary provided in Table 2. It is noteworthy to mention that some of the craft brewery websites met the indicator criteria generally rather than exhaustively. For example, if the logo included an image of indigenous an ingredient but did not name the ingredient, the authors included the visual expression as meeting the indicator.

Table 2. MFPCE Framework Indicators: Craft Brewery Website Results

Table 2 provides a visual representation of the MFPCE Framework Indicators noted on each brewery's website.

	Perceptual				Sociological			Ideological		Political		Ecological			Temporal	
Brewery	Brewery Names	Beer Names	Beer labels	Beer logos	Firsts	Location/ NJ	Identity/ folklore	Awards	Larger Connection	Age	Regulations	Indigenous Ingredients	Water	Geography	Seasonality	Time
Hidden Sands Brewing Company		●	●	●	●	●		●	●			●	●	●	●	●
Somers Point Brewing Company	●	●		●			●		●					●	●	●
Slack Tide		●	●	●		●		●	●			●	●		●	●
Ludlam Island Brewery	●	●		●					●	●		●	●	●	●	●
7 Mile Brewery		●			●				●	●		●		●	●	●
Glasstown Brewery		●	●			●	●	●	●					●	●	●
Pinelands	●	●				●			●		●	●	●	●	●	●
Cape May Brewing Co.	●	●	●		●	●		●	●	●	●	●		●	●	●

Indicator One: Perceptual

Overview. The first indicator of the MFPCE framework is entitled perceptual, which identifies specific elements of the NJ craft breweries that affect the five senses, including touch, taste, smell, sound, and sight. Perceptual skills are activities that humans use to understand what their senses communicate. They involve one's ability to organize and interpret information that is received and give it meaning. Through analysis of the NJ Craft Breweries websites, brewery names, beer names, and beer labels and logos, the following perceptual indicators were discovered. (It is noteworthy to mention that the content appeals to the specific senses of sight and sound; viewers cannot literally taste, feel, or smell the craft beer.)

Brewery Names. Four of the eight craft breweries use their namesake geographic locale as their brewery name; Somers Point, Ludlam Island, Pinelands, and Cape May Brewery. The remaining four use indigenous names relating to locale or relevant moniker attachment to their location. For example, Hidden Sands' name reflects the rainwater that filters under Southern NJ before reaching the 800' Aquifer. Slack Tide's name refers to the occurrence of relatively still water at the turn of the low tide. For 7 Mile Brewery, their name reflects the length of the town of their location, Rio Grande, NJ. Glasstown Brewery's name reflects the hometown of the brewery, Millville, New Jersey. Because South Jersey has an abundance of silica sand, it was perfect for the beginnings of the glass industry, hence "Glasstown" (Millville Public Library, n.d.).

Beer Names. Every brewery in this study utilized planned "naming" in their beer names. This supports their place name or location by linking to their brand location. Major consumer brands put enormous resources into developing brand names. Several examples are provided here. Somers Point Brewery's beer names are indigenous to their locale and history including coastal and bay references such as Bay Rat, Beesly's Point, and MDCXCIII (1693) which is dedicated to the establishment date of the town of Somers Point, NJ. Slack Tide's beer names include Angry Osprey and Bell Buoy. Glasstown Brewery's beer names include 856 and 609 which are area codes in NJ, and Maurice River, which is a tributary of the Delaware Bay in Salem and Cumberland Counties, NJ. Cape May Brewery boasts the name Cape May in at least four of their beer names. Other beer names include Coastal Evacuation; Always Ready (which pays homage to the Coast Guard located in Cape May, NJ); Misty Dawn, (named for a fishing boat); Tower 23 (named after an old WWII lookout at Cape May Point); Wild Wooder (after Wildwood a town in NJ); and Mooncusser (named after land-based pirates along the Delaware River who would lure ships to run aground by disabling the Cape May lighthouse and setting a separate fire further inland, giving the impression of a false shoreline). This research shows a beer name can do much more than simply convince someone to try the beer. Moore (2019) found that "A beer name can make you laugh, scratch your head or even ponder your place in the universe" (para. 1).

Beer Labels and Logos. Four of the eight breweries' beer labels reflected their beer with graphics linked to their brand locale. Hidden Sands Brewery portrays a water pump that is a link to the aquifer, the source of water used in the production of their beer. Slack Tide Brewery's beer cans are drawn by an exclusive artist hired by the brewery to reflect their beer names and indigenous seashore graphics including their signature fishing hooks logo. Glasstown Brewery embeds their "GB" logo with the outline of the state of NJ on each can label and Cape May Brewery beer labels reflect the Cape May name and three Seagulls. The Cape May beer labels depict the beer name in mostly seashore-themed graphics including seagulls, beach umbrellas, surfboards, clamshells, crabs, life rafts, octopus, shark jaw, and starfish.

Four of the eight breweries use graphics and images on their logos to depict the beer product and its process. Somers Point Brewery labels depict a glass of beer, with hops and wheat. Hidden Sands logo reflects the water aquifer, as previously mentioned. Slack Tide Brewery logo depicts beer hops and Ludlam Island Brewery logo depicts a diver's helmet.

Indicator Two: Sociological

Overview. The second indicator of the MFPCE framework, sociological, includes elements that communicate the location of the brewery, specifically mentioning NJ, claims of being *first* or the *only* brewery as an identifier, the mention of folklore, gender as it relates to nostalgia were also included.

Claims of First. Three of the eight breweries communicated claims of first as an identifier. Hidden Sands Brewery boasts their "First ever first-place win" at the 2018 Atlantic City Craft Beer & Music Festival for their "First Drop" beer. This coffee maple beer mixes neighboring Ocean City, NJ coffee and Vermont-based Davis Family Maple Syrup. Additionally, 7 Mile Brewery celebrated its first anniversary with a fundraiser that raised 10K for local charities and Cape May

celebrates First Firkin Friday where they tap a special firkin (small cask of specialty beer) available only in their tasting room.

Location/NJ. Five of the eight breweries specifically mentioned the state of NJ or surrounding geographic identifiers on their website. Hidden Sands Brewery communicated their proximity to Atlantic City, NJ as well their proximity to the Garden State Parkway and Atlantic City Expressway using NJ Exit number references. Slack Tide Brewery further makes a geographic connection to NJ by stating on their website they are located in Clermont, Cape May County, "a highly sophisticated state with 'gardenful' of choices to appreciate". Glasstown Brewery communicated "Drink NJ Beer in Millville, NJ". Pinelands Brewery communicated **"**Right at the edge of the Pines in Little Egg Harbor, NJ". Cape May Brewery boasts "NJ Proud" with a picture of the state using the moniker "Crafted on the Cape".

Identity/Folklore. Two breweries used folklore references to communicate tradition, beliefs, or stories of their communities. Somers Point Brewery named a beer after Ben Franklin called "Death and Taxonomy". Glasstown Brewery is named after a rich history in Millville, NJ, a glass-making town. The brewery is located at the Millville Airport within the Army Airfield Historic District. The Millville Army Airfield played an integral part in WWII where pilots were trained to fly the infamous P-47 Thunderbolt. Pinelands Brewery referenced nostalgia on their website communicating that they are "inspired by their surroundings" Further stating that "founder and Brew Master Jason Chapman handcrafts approachable ales of historic character." The website communicated that they are "ever inspired by our surroundings, the spirit of the Pinelands influences everything we do, from the names of signature brews to the laid-back atmosphere in our taproom".

Indicator Three: Ideological

Overview. The third indicator of the MFPCE framework, ideological, includes examining awards won and how they are communicated. It also includes how the brewery identifies larger connections with the world, gender as it relates to power, humor, colonialism, and the economy. The ideological indicator can examine any reference to being indigenous to the product, place, or process.

Awards. Half of the eight breweries in the study communicated awards won for their product. Hidden Sands mentioned winning the first-ever award for their Coffee Maple Beer in 2018 at the Atlantic City Craft Beer and Music Festival. Slacktide mentioned winning several awards such as a bronze medal for their Avalon Amber and a silver medal for Angry Osprey beers. On the Glasstown website, it boasted about the Maurice Bourbon Brown Ale winning first place and the Nightcap Belgian Blonde winning third place at the 2015 Atlantic City Beer Fest. The most extensive award winner was Cape May Brewery which showcased a comprehensive list of awards dating back to 2015.

Larger Connection. All eight of the breweries in the study communicated some kind of larger connection to the world. Six of the eight breweries talked about their beer production systems and capacities, had diagrams and pictures of events as well as their connection to sourcing and use of local ingredients. Hidden Sands also discussed their connection to a local Ocean City, NJ Coffee

Company. Cape May mentioned that each beer is crafted with quality ingredients, many of them locally sourced in Southern NJ. The Hidden Sands, Glasstown, and Cape May websites also communicated the use of indigenous ingredients. Ludlam and 7 Mile mentioned the fact that they are a part of the NJ Brewer's Association and the Association for Independent Craft Brewers. Pinelands took particular care to mention that they make hand-crafted ales of historic character right from the edge of the Pines.

Indicator Four: Political

Overview. The fourth indicator of the MFPCE framework, political, includes examining all references to the laws that have impacted NJ craft breweries. In this highly regulated industry, politics and power play a role in the regulatory climate of business operations. Politics and place are entangled and often play a role in how business takes place. The websites reviewed looked at age access and NJ laws through the political lens for compliance and business impact.

Age. Cape May, Ludlam, and 7 mile Breweries all had an age verification protection system at the time of the study. All of the websites referenced changes to occupancy and service due to restrictive regulations imposed by the NJ state government during the pandemic. More specifically, breweries were limited to hosting 25 person on-premises special events at this time and Cape May specifically addressed this on their website.

Regulations. Current regulations do not allow NJ breweries to serve food. Pinelands and Cape May Breweries communicated this on their website. They both have policies that allow guests to "BYOF" (bring your own food). This regulation has been in existence since the start of craft breweries in NJ. State law also requires breweries to give patrons tours of their facilities before serving them. However, under recently revised regulations, repeat brewery consumers are only required to take a tour once a year, as long as the brewery maintains a record of previous consumer participation in tours to demonstrate compliance. The new rules also aim to make the tours more substantive and meaningful. Pinelands Brewery did address this regulation on their website at the time of the study. NJ regulations do not permit outside alcohol and Cape May Brewery addressed this on their website at the time of the study.

Indicator Five: Ecological

Overview. The fifth indicator of the MFPCE framework, ecological, identifies all references to agricultural products including ingredients used in production, animal references, the elements including earth, wind, fire, land formations, weather, and seasons. This indicator highlighted the differentiating strategy of using natural and native ingredients grown and produced in NJ. All of the eight breweries incorporated elements of this indicator on their websites through their logos, text, or photos.

Indigenous Ingredients. Six of the eight brewery websites identified indigenous ingredients or referred to using fresh and local ingredients in their beer descriptions. Hidden Sands, Slacktide, Pinelands, 7 Mile, Ludlam Island, and Cape May were among the websites which articulated agricultural products. Local ingredients included cranberries, Pine Barren needles, Harry & Bean Coffee, and NJ honey. Ludlam Island's website communicated the most detailed information

listing coffee beans, a variety of fruit, pumpkin, rye, malt, oats, yam, cinnamon, nutmeg, clove, and ginger ingredients in their craft beer selection. Slack Tide, Somers Point, and 7 Mile's logos featured local ingredients such as fish, hops, grain, or wheat.

From a seasonal perspective, the websites featured ingredients for craft beers based on products harvested throughout the year. Pictures on the website captured summer images including the beach, sand, sun, and a bright blue sky. This may have been due to the data collection window in late summer and through early fall 2020. It is also noteworthy to mention that the pandemic may have delayed updates to reflect the fall or winter months.

Water. A predominant ingredient in beer, water, was the consistent element discussed on the website as four of the eight locations emphasized their water source or the quality of the water. Pinelands identified its "purest" water source from the Kirkwood-Cohansey Aquifer, which contains an estimated 17.7 trillion gallons of the "best all-natural drinking water in the world". Hidden Sands website communicated "Recipes and styles are designed to complement our pristine water source and appeal to a wide range of tastes". Hidden Sands also incorporated a water pump in their logo. Ludlam Island included water in their logo as they are 10 minutes away from the beach. Finally, Slack Tide's website explained that "Slack water is a short period in a body of tidal water when the water is completely unstressed, and there is no movement."

Geography. Seven of eight breweries used land formations in their name or web presence. Cape May and Somers Point breweries featured geographic branding. NJ beach photo images were prominent in Ludlam Island, Hidden Sands, and 7 Mile. Glasstown's logo features the state shape of NJ with a star indicating its location in Millville. Pinelands' logo incorporated the natural surroundings in its logo with three pine trees and a seagull.

Indicator Six: Temporal

Overview. The sixth indicator of the MFPCE framework, temporal, focuses on specific perceptions of seasonality and time in the travel and transport of food. References to events, holidays, hours of operation and tours, age of operation, production, or historical references of the business were considered as related to the conceptualization of time. Temporal indicators are ideal for marketing communications as the product is matched with holidays and annual traditions. Appealing to the seasonality of time influences the consumer to connect craft beverages with their daily activities.

Seasonality. The eight craft brewery websites presented content images of summer including the beach and sunshine, as observed in the first two phases of the data collection, which capitalizes on the seasonal nature of the state of NJ. This visual storytelling appeals to the perception of summertime as a more relaxed season that includes vacations and outdoor gatherings. Furthermore, Ludlam Island, Hidden Sands, Glasstown, and Cape May highlighted beer gardens or space available for rental during the summer season.

Likewise, the websites have the option to update their content (including images) to reflect holidays or seasonal changes. Seasonality changes were noted in the January 2022 data collection where Cape May, Ludlam Island, and SlackTide had holiday or winter images on their homepage.

The images included snow, a snowman, and a reindeer on a beer can, respectively. Seasonality is also observed in the beer names, as discussed in Indicator One: Perceptual. The updated menus reflect the change in season and any corresponding holidays.

Time. All of the eight websites included their hours of operation. Three of the sites, Slack Tide, 7 Mile, and Hidden Sands, specifically mentioned COVID business hours or regulations. Ludlam Island posted their 2021 Holiday Hours on their homepage. Additionally, Glasstown, Pinelands, and Cape May's websites provide historical references about the origin of their businesses. For example, Cape May communicated the following on their website.

> In July 2011, we found our home at the Cape May Airport, excitedly purchased our forklift, and delivered our first keg of Cape May IPA to Cabanas Beach Bar and Grill. Since then, we've proudly crafted balanced and flavorful ales and lagers for thousands of happy locals and visitors. Throughout the year, hundreds of our beers can be found throughout New Jersey, Eastern Pennsylvania, and Delaware. We are proud to distribute our beers to hundreds of bars, restaurants, and liquor stores, on draft and in cans, ensuring premium freshness and excellent service. Our Tasting Room is one of the largest and most accessible in the state, with a spacious and sunny Beer Garden. You can visit our gift shop, "The Brewtique," and take our interactive, self-guided tour. While many production breweries are only open a few hours per week, we are open daily from 12 PM–7 PM for tours and tastings. (Cape May Brewery, 2020)

DISCUSSION AND IMPLICATIONS

Overview

The purpose of this study was to analyze how eight craft breweries in Southern NJ communicated SOP to build brand identity through their websites. The study used Content Analysis to evaluate how SOP is communicated to build brand identity through these websites. This research focused on how the website can be used as a vehicle, versus other marketing techniques, to build brand identity and connect people to engage with local places. By examining the website impressions and contextual meaning of how the breweries communicated SOP, the authors were able to study each brand to assess their messaging to create a connection to the brewery's experience, product, location, mission, and more. As seen in Table 2, Cape May Brewery and Hidden Sands Brewery websites include the most MFPCE Indicator criteria promoting SOP. These websites demonstrate best practices modeling SOP and brand identity. On the contrary, the Somers Point website has fewer MFPCE Indicator criteria. However, based on the authors' experience, Somers Point is known to have a strong local reputation with quality products. Therefore, website content may not be reflective of a brewery's products and services. An outcome of this study is to argue website communication is one persuasive element of brand promotion. It reaches an unknown audience as opposed to a local word-of-mouth or social media endorsement to get people through the door. Both strategies are effective but website communication has a broader and accessible reach for experience-driven consumers. Layering images of SOP through the MFPCE Framework Indicators provides an inviting visual allure for prospective customers, making the brewery more enticing.

The authors defined SOP as a connection between people, place, and product. SOP is also a collective term describing an experience, interaction, relationships, memories, and attachment within a particular setting (Rajala, et.al. 2020). The eight craft brewery websites demonstrated the persuasive nature of SOP through language, landmarks, and images. The MFPCE framework served as the criteria to evaluate SOP consistently across all the brewery websites.

SOP is a powerful brand identity strategy as it provides an opportunity for businesses to differentiate their unique product features, stories, and historical roots. Brand identity includes an emotional element that conveys the user experience. Consumers connect with the affective appeal, experiential essence, and descriptive content included on the website. The goal is to create brand attachment with the consumer base. Brand identity breaks through the clutter of and differentiates itself through distinct graphics, fonts, colors, images, and recognizable logos.

The research shows that place attachment is suggested to be influenced by factors such as destination image, destination attractiveness, personal involvement, and visitor satisfaction (Altman & Low, 1992). It also shows websites provide a platform to promote brand identity. Breweries can communicate on their websites SOP as a brand differentiator to inform, and to create attachment and affection toward the brand (LeCompte et al, 2017; Madhavaram et al., 2005; Phelan et al., 2019). The literature provides clarity on place meaning, place elements, and place attachment (Insch & Walters, 2018).

The practical implications for the breweries to use SOP to build brand identity stress the importance of a well-designed website. The prominent and recurring appealing elements that communicate the brand's distinct characteristics include geographic local or indigenous names and logos, powerful perceptual connections, and consumer attachment to the physical location, mission, and brand. These differentiating symbolic elements that capture the local nuance promote SOP and the user experience as communicated via the website.

Websites are storytelling platforms and the ideal communication channel to maintain updated menus, promotions, announcements, and essential business information. Consumers search for content by name or keywords and website designers build the technical infrastructure for search engine optimization (SEO), as well as web design including graphics, content, and interactivity. The website presence is a central hub of information, reaching multiple target audiences. The literature emphasizes that consumers are most likely to view websites that are visually appealing and informative (Foroudi et al., 2019). Websites provide a consistent and dynamic presence for the brand. Consumers, particularly digital natives, refer to websites through mobile devices and other apps such as Yelp, Open Table, or Untappd (geosocial networking app dedicated to beer). Thus, websites are strategic communication platforms to build brand identity (Phillips et al., 2004).

This study utilized the MFPCE Framework indicators as a way to evaluate SOP on the craft brewery websites. The six MFPCE indicators included: perceptual, sociological, ideological, ecological, political, and temporal. The perceptual, sociological, and ideological indicators seemed to have the most content from all or most of the breweries. The perceptual indicator can be easily conveyed through text and images. The sensory experience is a common strategy for food and beverage marketing. An attractive photo invites the consumer to taste and smell the beer through

sight, hear the sounds of beer filling a mug, and feel the momentary chill from touching a frosted mug. The sociological indicator can persuade people to think about social gatherings, fond memories, social identity, and folklore. These indicators promote the user experience. A small business can upload images, videos, and graphics that demonstrate how people interact with the brand. The ideological indicator, allows the brewery to showcase important information such as awards, indigenous ingredients, and social relations. Communicating awards won for beer competitions allows consumers to recognize the achievement and communicates prestige.

Most of the craft brewery websites managed to elaborate on the ecological indicators. The ecological indicator communicates natural and native ingredients which allows consumers to gain knowledge about how the brewery incorporates local ingredients into their products and how they support their local economy. Ecological factors including raw ingredients appear through website images, including the logos, that are included on menus. Water, as a primary ingredient in beer, represents the description of natural elements. Geography was also key for these breweries as seven of eight captured the location through the marketing efforts.
This resonates with patrons who care about supporting the local community which can translate into loyal consumers.

Additionally, most of the craft brewery websites focused on the temporal indicator as it allows incorporation of the seasons and dates of production. The change in seasons is a perfect time to refresh the menu of available craft beers and remind consumers that something new is available for them to enjoy. Seasonal updates of website material are a natural time marker for a business to upload new photos and updated text (such as menus, holiday hours, etc.). In this study, seasonality was a factor as all eight breweries located in Southern, NJ with four distinct seasons. Communicating hours of operation on the website is a basic and critical component that every brewery provided. Breweries can expand their communication to include event information, rental capabilities, seasonal beers, and more.

The political indicator had the fewest details identified. Because craft breweries in NJ are highly regulated, and every state has its specific laws regulating the craft breweries, messaging about age, tours, and food not only communicates compliance on behalf of the brewery but informs the consumer what to expect when visiting the destination. Five of the eight brewery websites mentioned the legal drinking age or COVID updates as it related to business operations. At the time of this study, none of the eight websites noted any historical information or geopolitical boundaries/natural geographic features like a river to form a border or barrier between areas within the state of NJ. The political indicator information tends to be the least visual of the six indicators. It is important to include political and historical information in storytelling although it may not be the most engaging for the target audience.

The website acts as the primary platform where consumers can connect to other branded communication platforms including social media channels, advertisements, and word-of-mouth. Thus, a professional and informative website is an essential tool for promoting brand identity. A website is a cost-effective platform to promote brand identity. Once the initial investment for infrastructure and content development is made, the website has a minimal maintenance cost. The website is always available for consumers with access to the internet.

Recommendations for the Breweries

The craft beer landscape in NJ has exponentially grown over the last 10 years totaling over 127 breweries (Bobal, 2020). The breweries in this study have the ability to capitalize on every element in the MFPCE framework to communicate SOP on their website. The breweries can use the framework as a lens to cultivate content to tell the story of their brewery to resonate with website visitors.

Of the eight breweries, Cape May had the most comprehensive storytelling in all six indicators. Their website communication was comprehensive, descriptive, effective, and visually appealing. Each brewery can do an internal audit of each indicator to decisively pinpoint their unique content to tell their story. This is a powerful branding tool that attracts consumers using the website as a vehicle to learn about their product, location, story, and experience at the brewery. Because no two stories can be the same, the use of SOP to communicate the brewery's brand is a differentiator and can help each brewery appeal to its target audience. The SOP storytelling allows the brewery to create interesting, memorable, and engaging content on the website that has the potential to drive the audience to their location to experience the place and product.

Website updates reflect the dynamic nature of new products, user experiences, and information. This communication tool provides a natural connection to reach loyal patrons and consumers who are interested in a new experience. SOP maintains itself as a natural storytelling frame via the website when the material is fresh. The authors recommend a strong web presence that contains visually appealing images, branded material, and updated content. Additionally, continuous content creation on the website through the use of (but not limited to) blogs, video, or infographics to connect with consumers and stay relevant is a best practice for website brand management.

This study focused on website communication for the eight breweries, although some of the breweries used social media as their primary tool for introducing new products or events. A website provides an opportunity to inform the target market of new products, events, and SOP elements. A well-developed IMC campaign includes intentional and consistent communication across all communication channels. While social media channels can provide up-to-date content and promote user interactivity, website communication is sometimes overlooked when it comes to updating content and images. A poorly designed or outdated website will undervalue the brewery. The website is the tool that may entice a new consumer to visit a location. If the consumer is not motivated by the content or design of a website, they may miss the opportunity to learn what the craft brewery has to offer. The idea of "the consumer will not know what they don't know" applies to website communication. Communicating brand identity through the website makes the brewery more accessible, engages consumers, and helps increase sales and consumer loyalty.

LIMITATIONS AND FUTURE RESEARCH

Limitations

This study has several limitations. First, the sample size was limited and only evaluated eight craft breweries in one geographical location. Future research might consider expanding the sample size and geographic location. Second, only websites were used as the means to collect data to evaluate

how craft breweries communicated SOP to consumers. Furthermore, since websites should be evergreen, websites are constantly being updated and the data collected from September to November 2020 for this study may no longer reflect information on the current brewery websites. Third, since SOP is a multidisciplinary concept, additional research could assess SOP as it relates to the range of connections between people and places based on place meaning and attachments for a particular setting. Areas such as biophysical attributes, functional meaning related to actual or desired use, experiential meaning based on individual experiences, and interpersonal meaning that comes from social aspects of interactions with other individuals or the place could be evaluated. This could be accomplished via onsite visitations through field interviews or participant observations with consumers in craft breweries.

Future Research

Future research could evaluate how a craft brewery's physical space and employees communicate SOP to create personal experiences, cultural values, and shared meanings for consumers. Finally, since there are several mechanisms to communicate brand identity, future research could evaluate breweries' use of social media platforms and how they are used in communicating SOP to consumers.

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ARE PARADIGMATIC ANALYSES USEFUL? THE CASE OF MONETARISM, THE AUSTRIAN SCHOOL, AND THE BRAZILLIAN ECONOMY OF 2004-2016

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ABSTRACT

One recent graduate-student-authored working paper that sparked a chuckle among several of its readers asserted that rapidly increasing real GDP in the short run caused by an unanticipated increase in the money supply "proves the validity of monetarism." The claim was ridiculed because the Keynesian and Austrian macroeconomic schools hold the same tenet, thus the unique validity of monetarism was not proven by the student. This turned out to be an unpleasant surprise to the paper's mathematically gifted but economically challenged author. The present writers are sympathetic. An earlier version of this paper analyzed Brazil's 2004-2016 business cycle, which included the nation's worst economic recession in more than a century. The behavior of different macroeconomic aggregates was examined, including real GDP, the money supply, interest rates, savings, industrial production of higher- and lower-order goods, and inflation. While the paths of said aggregates were found to well fit the pattern of predictions made by Austrian Business Cycle Theory (ABCT) with the authors ready to begin statistical tests, some thoughtful off-the-record criticisms advised gathering more data and evaluating them in light of the theoretical predictions made by ABCT's main competing paradigm, monetarism. Hence the purpose of this paper. The results reveal that the critics had a valid point: when a new paradigm is brought into the picture, what previously looked like a good-enough fit can change. Thus, the value of paradigmatic analysis, an analytic method undertaken way too infrequently today.

Keywords: Monetarism; Austrian Business Cycle Theory (ABCT); Brazil; Recession; Macroeconomics.

INTRODUCTION

Since the beginning of the Twentieth Century, long-term economic growth in Brazil has been elusive. While the last ten recessions (not counting the recent COVID-19 recession) have averaged 4.2 months (Federal Reserve Economic Data, "Total Gross Domestic Product for Brazil") compared to 11.1 in the U.S. (National Bureau of Economic Research, "U.S. Business Cycle Expansions and Contractions"), those ten Brazilian recessions took place inside of just seven years (third quarter of 2012 to third quarter of 2019) while in the U.S. the last ten recessions (again, not counting COVID-19) took place between July 1953 to June 2009, a period of 55 years and 11 months.

The perennial dispute in policymaking circles in Brazil centers on which factors lie behind the nation's inability to sustain long-term economic growth. Motivated by this debate, this paper will

analyze Brazil's latest severe recession considering monetarism and Austrian Business Cycle Theory (ABCT).

LITERATURE REVIEW

Monetarism

Monetarism has roots extending back to Richard Cantillon (1680-1734), Henry Thornton (1760-1815), David Ricardo (1772-1823), and John Stuart Mill (1806-1873). All of these theorists understood that greater quantities of money increased demands for goods and services and thus raised prices (Ekelund and Hebert, 1990, p. 537). Irving Fisher (1867-1947) and Knut Wicksell (1851-1926) explored long-run issues with respect to money and macroeconomic stability (Ekelund and Hebert, 1990, p. 537). However, the most renowned monetarist of all time remains Milton Friedman (1912-2006), whose *Monetary History of the United States, 1867–1960*, written in 1963 with Anna Schwartz, posited the monetary causes of the Great Depression and helped Friedman win the Nobel Memorial Prize in Economic Sciences in 1976. According to Friedman, "Inflation is always and everywhere a monetary phenomenon" (1968, p. 39).

Despite Austrian micro- and macroeconomics (including ABCT) experiencing a revival for at least the past two decades, monetarism is still ABCT's chief and mainstream competitor. Monetarism is built around three propositions (Meltzer, 1993):

1. Inflation is produced when money continuously grows at a rate higher than that of real output. The relationship between money growth and inflation is not rigid. Money growing at a higher rate than real output is a necessary but not sufficient condition for inflation.

2. When expected inflation is high, nominal interest rates will be high and the value of the inflated currency will fall relative to that of more stable currencies. The relationship between inflation and currency depreciation is not one to one. However, continuous inflation produces currency depreciation and continuous disinflation produces currency appreciation.

3. The effects of money growth are first felt on output, and then on the price level.

Three corollary and causal relationships related to the aforementioned three propositions are:

A. Excessive money growth leads to inflation and high nominal interest rates.
B. Unanticipated increases in money growth lead to short-term increases in real GDP (booms).
C. Unanticipated declines in money growth lead to short-term decreases in real GDP (recessions).

Two ideas from classical economics embraced by monetarists are *classical dichotomy* and *monetary neutrality*. The classical dichotomy is that real and nominal variables can be separated for analysis while monetary neutrality holds that changes in the money supply affect only nominal variables and not real ones over the long run. These classical ideas are compatible with not only the monetarist *quantity theory of money* (explained below) but also the real business cycle school of macroeconomics.

Monetarism: Some Empirical Evidence

Space constraints preclude adducing evidence for all of the aforementioned relationships in monetarist theory. What will be reviewed is evidence supporting proposition 1: the relationship between money growth and inflation is not a mechanistic, rigid relationship like that between the handlebars of a bicycle and the bicycle's front tire. It is much more like the turning of a very large ship's rudder wheel and the eventual change in direction of travel of said very large ship. Table 1 below illustrates this.

Table 1. Money Growth and Inflation in the U.S. 1960-1991

	Money Growth (%)*	**Inflation (%)***
1960-1964	2.8	1.6
1965-1969	4.9	3.7
1970-1974	6.0	6.0
1975-1979	6.9	7.9
1980-1984	6.6	7.3
1985-1989	7.2	3.5
1987-1991	4.4	3.8
*compound annual rate		
Source: Meltzer 1993		

What can be seen in the four-year intervals from 1960 to 1991 is that when money growth tends to rise, the inflation rate tends to rise as well. When money growth tends to fall, the rate of inflation tends to fall. The only clear exception is the 1985-1989 period, where money growth rises at a rate higher than that in any other four-year interval in the sample period (7.2.%) yet the rate of inflation for this four-year period (3.5%) was lower than that of any other four-year period in the sample save one (1960-1964: 1.6%). Monetarists believe that the likely culprit of this steep fall in inflation was strong economic growth from the mid- to late 1980s. These data demonstrate the monetarist proposition that money growth tends to drive inflation, but the relationship is not strictly mechanical. Changes in economic growth can not only disrupt what seems like a dependable pattern, but changes in money velocity (the rate at which money moves from one individual to another) can have the same disruptive effect. The relationships among all of these variables can be seen in the famous *equation of exchange* (EOE) tautology

MV = PQ where

MV = nominal spending in an economy
PQ = nominal GDP
and separately:
M = money supply
V = velocity
P = price level
Q = real GDP

These relationships are applied in the quantity theory of money, where *V* (assumed to be stable) is relatively constant in the short run, *Q* is relatively constant in growth rate over the short run, and

M determines the price level, *P*, with changes in *M* determining the rate of inflation (change in *P*). Per monetary neutrality, real GDP (*Q*) is not affected by the money supply (*M*) over the long run (Wen, 2006).

Austrian Business Cycle Theory (ABCT)

The first and most fundamental version of ABCT was first delineated by Ludwig von Mises (2008, 2009). ABCT was then further refined by Friedrich August von Hayek (1931a, 1931b, 1933), Murray Rothbard (2000, 2009), and Roger Garrison (1978, 1997, 2001, 2004, 2012). Recent revisions have been explicated by Carilli and Dempster, 2001; Evans and Baxendale, 2008; Engelhardt, 2012; Salerno, 2012; Macovei, 2015; and Giménez Roche, 2014.

While changes in fiscal policy do not necessarily affect every transaction in an economy, monetary policy is a different story. Business cycles can begin when unanticipated money creation forces interest rates below their natural market level (where more money means lower costs of borrowing), stimulating artificial development of capital-goods (e.g., large machinery, heavy equipment) industries (Mises, 2008). In addition, consumption will also be stimulated as consumers will have an incentive to spend more and save less since credit-card interest rates will have fallen as well as interest rates on savings accounts. When spending on both consumption and capital goods is stimulated, a tug-of-war competition for scarce resources ensues (Garrison, 2001).

The first stage of the new business cycle is a boom that is the result of the stimulated dual spending on consumer and capital goods. A euphoria of prosperity prevails (Mises, 2011, p. 564). The new artificially lower interest rates drive growth of real output. Consumer and capital projects are implemented, with the latter being more sensitive to interest-rate changes and money growth because capital-goods/higher-order manufacturing requires more investment than consumer-goods/lower-order manufacturing. Thus, capital projects will begin growing at a higher rate than consumer projects (Hayek, 1931a).

Because of natural scarcity alone, an economy will not have all the resources necessary to complete all the consumer and capital projects being simultaneously pursued under these conditions. On the one hand, qualified labor and land (factors of production) are scarce resources and simultaneous competition for them for consumer and capital projects will lead to their prices rising (Garrison, 2001, p. 72). On the other hand, capital is also a scarce resource and, when purchased with newly created money, its price rises as well (Mises, 2008, p. 550).

The problem comes when consumers and firms discover that the source of increased spending in the economy is money creation rather than a natural increase in the productivity of workers and firms. The result is inflation, a general increase in prices in an economy. Thus, the nominal interest rate (real interest rate + inflation premium) rises as lenders add an inflation premium onto the real interest rate to compensate for the fall in the purchasing power of the currency unit.

Inevitably, a recession will follow and pessimistic expectations in the market will turn projects once deemed profitable into malinvestments (Rothbard, 2009; Holcombe, 2017). Banks will then tend to impose greater restrictions on lending because of negative expectations for the economy. The result is a leveling off or fall in money expansion (Mises, 2008, p. 565).

Intersections and Divergences

Monetarists and Austrians agree on some points. Both see positive unanticipated changes in the rate of money growth as the ultimate driving force behind unsustainable booms. Both see the importance of the distinction between real and nominal interest rates. Both see monetary relationships as lending support to institutional rules as opposed to policy activism. Keynesian fine-tuning of the economy (stimulating growth during recessions and curtailing it during booms) is frowned upon by both schools.

In terms of differences, Austrians see a particular order of events in business cycles: monetary expansion; falling interest rates; a boom characterized by malinvestment, overconsumption, and an unnaturally distorted structure of production; then an eventual turning point characterized by rising nominal interest rates (with inflation premiums now built into each rate); and then a recession with liquidation of malinvestments. The process follows a sine wave every time in terms of pattern: rise, peak, and fall. What also seems to be implied in some sources is that most if not all periods of strong growth are driven by excessive growth in the money supply.

Monetarists see the Austrian cycle as too rigid. An economy can be growing at a significant rate (say, 3 percent) with low inflation and an unanticipated change in the money supply can induce a more intense boom or recession depending on the direction of change. An even more intense boom would be triggered by an unanticipated increase in the money supply while a recession would be induced by an unanticipated decrease in the money supply. Monetarists believe that an unanticipated drop by almost one third in the U.S. money stock between 1929 and 1933 was the primary cause of the Great Depression. In contrast, Austrians believe that the business cycle containing the Great Depression was initiated by an increase in the money supply in the 1920s which ultimately proved unsustainable. For monetarists, the secondary factors creating the Great Depression included very badly timed increases in taxes and tariffs, and Austrians for the most part agree with these secondary factors.

METHODOLOGY

To accurately designate the different phases of the business cycle and examine other phenomena, the relevant macroeconomic variables were identified and collated.

1. Real GDP
2. Price level/Inflation
3. Money supply
4. Velocity
5. Exchange rate
6. Interest rate
7. Credit expansion
8. Savings
9. Industrial production of higher-order (capital) goods
10. Industrial production of lower-order (consumer) goods

From the monetarist perspective, Table 2 below lists the expected behaviors of these aforementioned ten variables throughout a business cycle.

TABLE 2. EXPECTED RESULTS (MONETARISM) †

VARIABLE	**BOOM**	**BUST**
Real GDP (*Q*)	Positive rate of growth (by definition).	Negative rate of growth (by definition).
Price level/Inflation (*P*)	Rises, falls, or remains constant (equation of exchange).	Rises, falls*, or remains constant* (equation of exchange).
Money supply (*M*)	Rises, falls*, or remains constant* (equation of exchange).	Rises, falls*, or remains constant (equation of exchange).
Velocity (*V*)	Stable.	Stable.
Exchange Rate	Rises or falls with the money supply (proposition 2).	Rises or falls with the money supply (proposition 2).
Interest rate (nominal)	Rises, falls, or remains constant with expected inflation (proposition 2).	Rises, falls, or remains constant with expected inflation (proposition 2).
Credit expansion	No prediction.	No prediction.
Savings	No prediction.	No prediction.
Industrial production of higher-order goods	No prediction.	No prediction.
Industrial production of lower-order goods	No prediction.	No prediction.

†The extensive EOE derivations required to arrive at the boom and bust predictions for the EOE variables *M, V,* and *P* are not provided in this paper because of space constraints.
*Possible but highly unlikely scenarios given central-bank norms.

From the perspective of the Austrian school, Table 3 below lists the expected behaviors of the ten variables throughout a business cycle.

TABLE 3. EXPECTED RESULTS (ABCT) †		
VARIABLE	**BOOM**	**BUST**
Real GDP	Rises (Mises, 2008, p. 610).	Falls (Mises, 2008, p. 610).
Price level/Inflation	Rises (Mises, 2008, p. 550).	Levels out or falls (Mises, 2008, p. 566).
Money supply	Rises (Haberler, 1983, p. 9).	Levels off or falls (Haberler, 1983, p.9).
Velocity	No prediction.	No prediction.
Exchange Rate	No prediction.	No prediction.
Interest rate (nominal)	Falls (Garrison, 2001, p. 69).	Rises (Garrison, 2001, p. 72).
Credit expansion	Rises (Mises, 2008, p. 549).	Falls (Mises, 2008, p. 565).
Savings	Stagnates, falls, or rises less than credit expansion (Garrison, 2001, p. 70).*	No explicit prediction.
Industrial production of higher-order goods	Rises more than lower orders (Rothbard, 2009, pp. 19-20).	Falls more than lower orders (Rothbard, 2009, pp. 19-20).
Industrial production of lower-order goods	Rises less than higher orders (Rothbard, 2009, pp. 19-20).	Falls less than higher orders (Rothbard, 2009, pp. 19-20).

†Unlike monetarism, the boom and bust predictions contained in this table (where applicable) are derived only from theory.
*No explicit prediction for this was found in ABCT but instead was deduced from the theory of Garrison (2001) in which it is impossible to have growth in credit markets when savings falls except in the case of policy intervention.

THE BRAZILIAN CYCLE

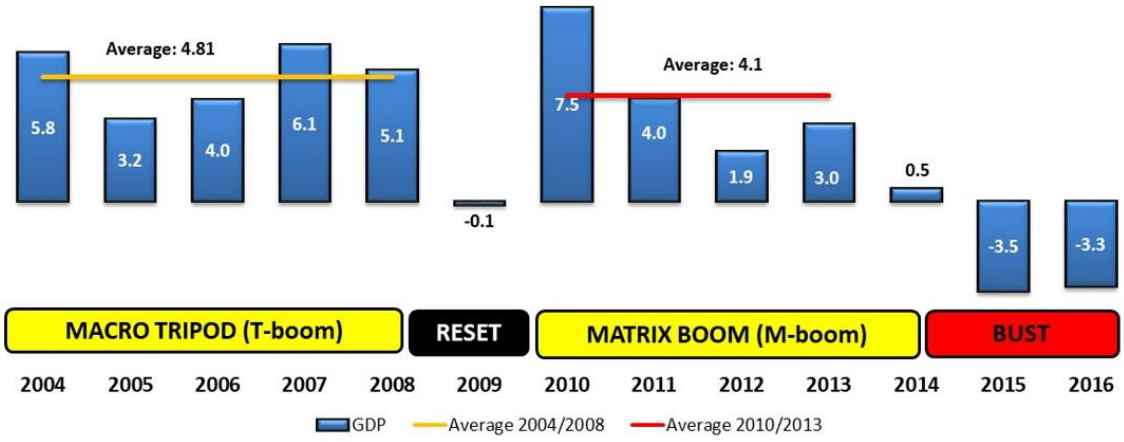
Real GDP

Figure 1 below displays average yearly real GDP growth for Brazil for 2004-2016. As can be seen, growth was positive for all years for 2004-2014 except for 2009. The Tripod period (2004-2008, named after the "Tripod" economic agenda of President Fernando Henrique Cardoso) had an average 4.81-percent annual growth rate. The interim year 2009 was characterized by low negative

average growth of -0.1 percent. From 2010 to 2013 (in the Matrix period named after the "New Matrix" economic agenda of President Luiz Inácio Lula da Silva), annual growth averaged 4.1 percent. The economy experienced very low growth in 2014 before sinking into a deep recession with -3.5 and -3.3 percent growth in the years 2015 and 2016, respectively. The recession ended in the first quarter of 2017 when the Brazilian economy experienced a positive quarterly increase in real GDP of 1 percent (hence this period is not shown in the figure).

The Reset year of 2009 (with first- to fourth-quarter growth rates of real GDP of -2.4, -2.2, -1.2, and 5.3, respectively; IBGE, 2020) is the first juncture at which monetarism and the Austrian school would diverge. In terms of the period illustrated in Figure 1, monetarists see the 2004-2009 interval as one business cycle, while the fourth quarter of 2009 through the fourth quarter of 2016 interval marks the second business cycle. Austrians see the entire 2004-2016 period as representing a single business cycle. For expositional simplicity, this paper will treat the 2004-2016 period as a single cycle, thus "cycle" will refer to the entire 2004-2016 period unless noted otherwise.

Figure 1. Brazil's Average Annual Growth in Real GDP (2004-2016)



Source: Central Bank of Brazil. GDP series 7326.

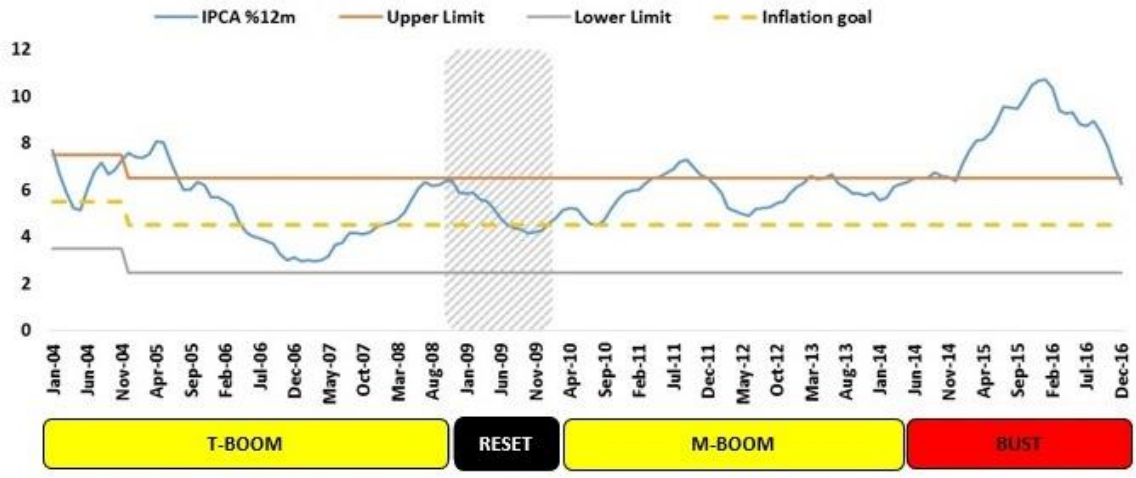
Table 4 below divides the 2004-2016 Brazilian cycle into three phases. Phase 1 will correspond to the years 2004-2008, the boom of the Macro Tripod policy years. Phase 2 will correspond to the years 2010-2014, the boom of the New Matrix years, but also (for analytic simplicity) extend back into the recession year of 2009 (Reset). Finally, Phase 3 will correspond to the bust years of 2014-2016.

Table 4. Components of the Brazilian Business Cycle (2004-2016)			
Phase	**Stage of Business Cycle**	**Label**	**Time Period**
1	Boom	Macro-Tripod Boom (T-boom)	Jan. 2004-Sep. 2008*
2	Boom	Reset + Economic-Matrix Boom (Reset + M-boom)	Reset: Oct. 2008-Dec. 2009 M-boom: Jan. 2010-Feb. 2014
3	Bust/Recession	Bust	Mar. 2014-Dec. 2016
*The precise monetarist dating for this period would be from the fourth quarter of 1999 to the third quarter of 2009.			

Price Level/Inflation

Figure 2 below shows the performance of consumer inflation during the three phases of the cycle. The most remarkable pattern revealed is the gradual loss of control by the Brazilian central bank. As will be seen, the periods in which inflation was mostly outside of the Brazilian central bank's (*Banco Central do Brasil*, or BCB for short) target range were mainly in the bust phase.

Figure 2: Consumer Inflation (2004-2016)



Source: Central Bank of Brazil (BCB). IPCA series 13522. Inflation target series 13521.

According to Table 5 below, in 49 months of Phase 1, inflation was within BCB's target range, a success rate of approximately 88 percent. Inflation averaged about 5.3 percent per annum during this period. Phase 2 had similar results. During the bust, Brazil's inflation rate was higher than in any other phase. In January 2016, inflation reached a peak of 10.71 percent, the highest level for Brazil in the previous 13 years. During the bust, inflation was within its target range for only five months out of 34, giving BCB a rather unimpressive success rate of 15 percent!

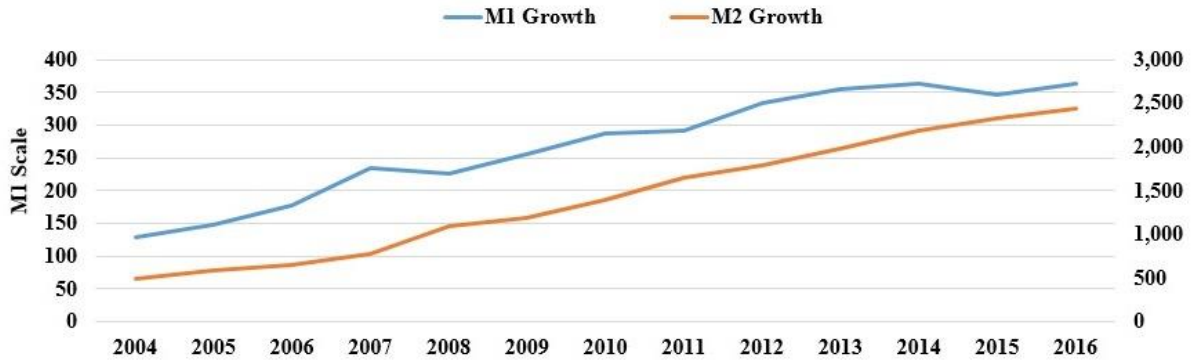
Table 5. Inflation-Goal Performance						
Phase	**Label**	**Months within target range**	**Months outside target range**	**% within target range**	**Total months in period**	**Average inflation rate (% in period)**
1	T-boom	49	7	88%	56	5.3%
2	Reset + M-boom	54	12	82%	66	5.7%
3	Bust	5	29	15%	34	8.2%
Total		**108**	**48**	**69%**	**156**	**6.1%**
For the classification of inside or outside the target range, the inflation range set by BCB was used (Central Bank of Brazil 2018).						

Money Supply

Monetary aggregates measuring the size of the money stock are defined in Brazil just as they are in the U.S. In other words, M1 consists of currency, checking accounts plus similar, and traveler's checks. M2 consists of M1 plus savings accounts, small time deposits, money-market mutual funds, and some minor savings vehicles (Mankiw, 2018, p. 324). The behavior of M2 after the reduction in the interest rate from 15.46 percent in 2006 to 12.15 percent in 2007 is notable. Table 6 below displays the compound-adjusted growth in M1 and M2 in each phase of the cycle. Figure 3 displays the continuous growth in both aggregates across the cycle.

Table 6. Compound Average Growth for M1 and M2						
Phase	**Stage of Business Cycle**	**Time Period**	**Time Period**	**CAG M1**	**CAG M2**	**M2 Average (Phase 2 Only)**
1	T-boom	Jan. 2004	Sep. 2008	15.34%	20.83%	
2	Reset	Oct. 2008	Dec. 2009	24.52%	12.15%	12.98%
	M-boom	Jan. 2010	Feb. 2014	8.54%	13.71%	
3	Bust	Mar. 2014	Dec. 2016	4.43%	7.27%	
Source: Central Bank of Brazil (BCB). M1 and M2 series 27791 and 27819, respectively.						

Figure 3: M1 and M2 Growth (Millions R$)

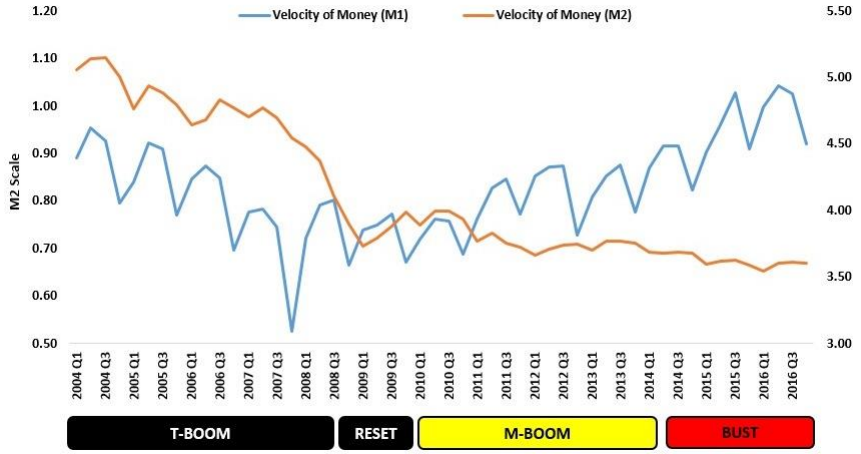


The growth rate in M2 was 20.83 percent in Phase 1 and 12.98 percent (average, see Table 6) in Phase 2. Thus, it should be no surprise that the average nominal interest rate between these two periods fell 35 percent. More money means lower rates.

From Figure 1, recall the massive jump in real GDP from -0.1 percent in 2009 to 7.5 percent in 2010. Notable is that this massive swing came on the heels of a boost in M2 from R$755,191 million in January 2008 to R$1,068,178 million in January 2009, a stunning one-year increase in the money supply of 41.4 percent (Central Bank of Brazil 2019). (*R$* is the symbol for the Brazilian *real*, the Brazilian currency unit.)

Velocity

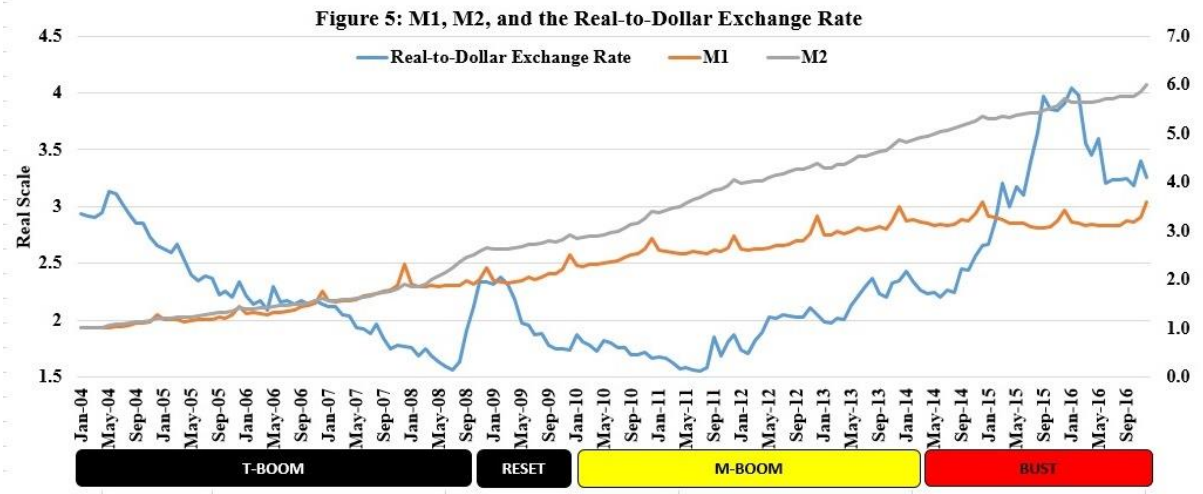
Figure 4: Velocity of Money (M1 and M2)



In Figure 4 above are two different versions of velocity based on two different measures of the money supply, M1 and M2. What is stark in both graphs is a regime change in each. In late 2007 is a clear inflection point in the trend of M1 velocity toward the end of the T-Boom but before the beginning of the Reset. After that point velocity seems to be trending steadily higher. In all, the entire time series has a shallow "V" shape.

For M2, the "V" shape is much less pronounced but still visible. A steep downward trend commences at the beginning of the cycle before yielding to a second less steep downward trend. In a nice correlation with changes in real GDP, the inflection point of the regime shift falls slightly after the beginning of the Reset period. In light of the classical dichotomy and monetary neutrality, the trends in M2 suggest that the booms were significantly money driven and the prosperity during the boom periods illusory. What exactly caused the structural changes to occur at different times for M1 and M2 is a topic for future research.

Exchange Rate



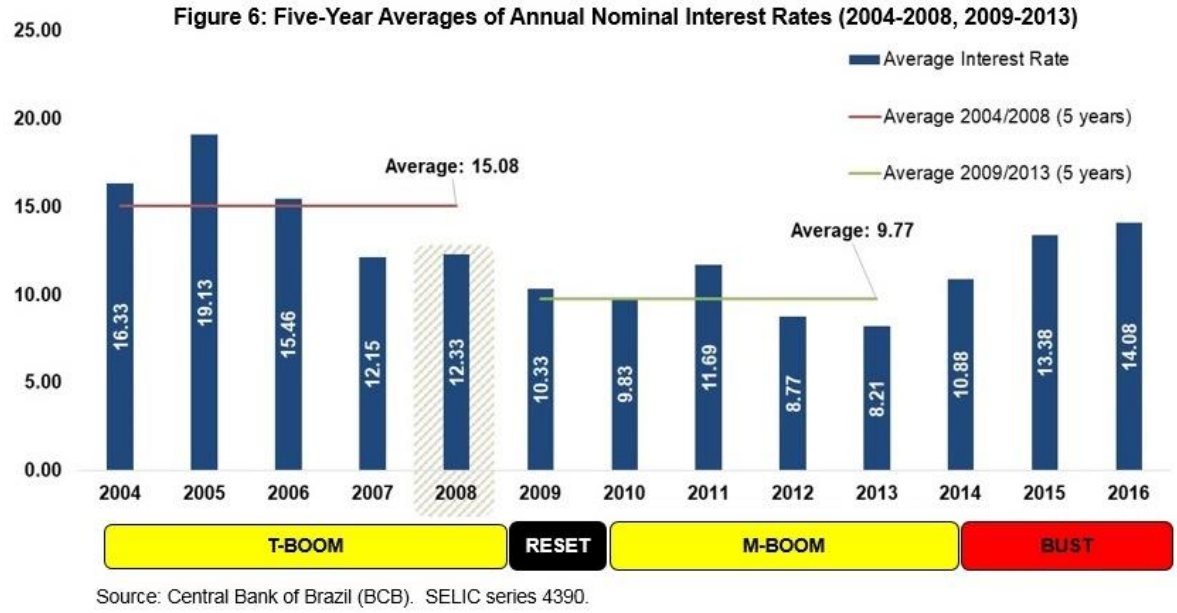
The data behind Figure 5 above show a clear and continuous appreciation in the Brazilian real from January 2004 (R$2.94) to July 2008 (R$1.57), a rise of about 46.6 percent. This corresponds almost exactly to the era of the T-Boom. From about August 2008 (R$1.63) to February 2009 (R$2.38) there was a depreciation in the real (about -46 percent). From there was an appreciation until July 2011 (R$1.56, 34.5 percent). Then from there was a steady depreciation all the way to January 2016 (R$4.04, -159 percent). From that point there was a steady appreciation until the end of the bust in December 2016 (R$3.26, 19.3 percent).

Overall, the patterns displayed in Figure 5 seem to favor monetarism, particularly proposition 2: "the relationship between inflation and currency depreciation is not one to one. However, continuous inflation produces currency depreciation and continuous disinflation produces currency appreciation." While the appreciations over the Tripod, February 2009 to July 2011, and January 2016 to December 2016 periods seem to contradict the steady rises in M1 and M2 over the same periods, the "chickens come home to roost" in the August 2008 to February 2009 and July 2011 (R$1.56) to January 2016 (R$4.04) periods, especially the latter which is 54 months (4.5 years) of steady depreciation.

Second, in the bust, the Brazilian economy was afflicted with stagflation (stagnant growth plus inflation) that monetarism, with its room for lags between excess money creation and its adverse effects, tends to explain better than its competitors.

Interest Rate

Figure 6 below displays the annual nominal interest rate throughout the cycle. In Phase 1, the interest rate averaged 15.08 percent per annum. During Phase 2, the mean interest rate was 9.77 percent. This is a difference of 5.31 percentage points, a fall of 35 percent.



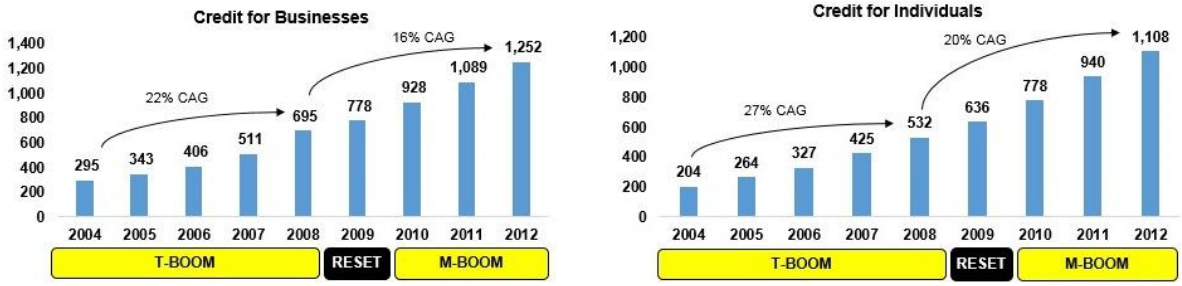
Source: Central Bank of Brazil (BCB). SELIC series 4390.

Since the real interest rate throughout the cycle displays the same pattern as the nominal rate and given current space constraints, the authors will not display it here.

Credit Expansion

Figure 7 below shows the growth of credit in the first two phases of the cycle. Displayed in the first graph (on the left) of Figure 7 is the growth pattern of business credit. It is composed of government and free-market credit for businesses. The average annual compound growth rate was 22 and 16 percent for Phase 1 and Phase 2, respectively. Displayed in the second graph (on the right) of Figure 7 is the growth pattern of credit for individuals. Note that the growth of credit for individuals is even higher than the growth of credit for businesses in Phase 1, reaching 27 percent (versus 22 percent for businesses). In Phase 2, there is an impressive 20-percent rate of continued growth in credit for individuals. Not surprisingly, the growth rates of credit in Phase 1 for both graphs (22 and 27 percent, respectively) are higher than their counterparts in Phase 2 (16 and 20 percent, respectively). While the declines were significant but not very large, they suggest diminishing returns to money creation as a credit stimulus.

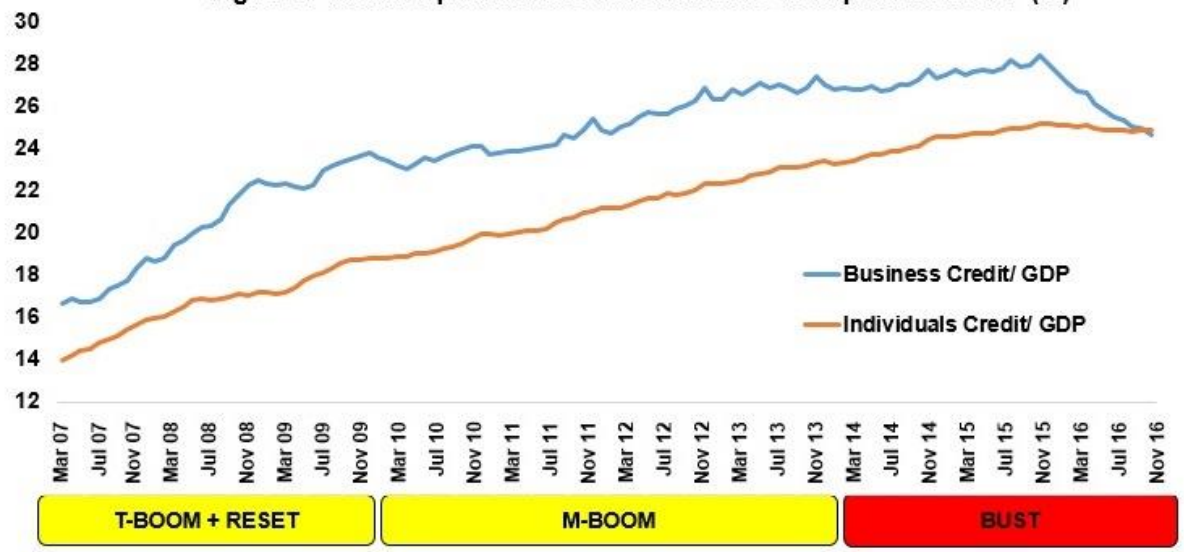
Figure 7: Credit Expansion for Businesses and Individuals (Billions R$s)



Source: data from BCB, elaborated by authors. The business credit series is a result of the sum of government credit policies for business (code 20021) and free-market credit for business (code 12128). For individuals, data were calculated using the sum of government credit policies for individuals (code 20020) and free-market credit for individuals (code 12127). The month of December of each year was used as a basis for the calculation. For the calculation of compound-average growth (CAG) in 2004, December 2003 was used as the starting point. The series were discontinued starting in 2012, which means that Phase 2 in the charts above is missing data for 2013.

Figure 8 displays business and individual credit as a proportion of GDP. Both variables rise steadily through both booms until leveling off and falling during the bust.

Figure 8: Credit Expansion and Contraction as a Proportion of GDP (%)

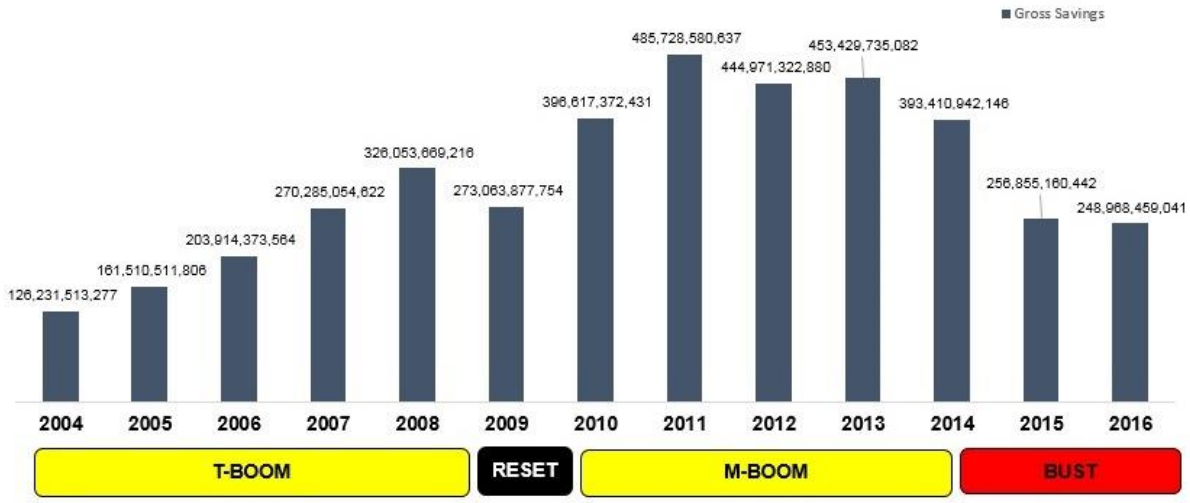


Source: Central Bank of Brazil (BCB). Business credit/GDP series 20623. Individual credit/GDP series 20624.

Savings

Figure 9 below displays yearly gross savings in current U.S. dollars throughout the cycle. As can be seen in the figure, savings rose in the Tripod boom but fell slightly in the Reset year of 2009. As the Matrix boom gained steam, savings peaked in 2011 and then fell slightly through 2014, then experienced a significant drop-off from 2014 to 2015 and 2016.

Figure 9: Brazilian Gross Savings in Current U.S. Dollars (2004-2016)



Source: World Bank, 2019. Gross savings in current U.S. dollars.

Industrial Production of Higher- and Lower-Order Goods

Capital/higher-order goods (e.g., machines) are used to make intermediate goods and final products. Final products (consumer/lower-order goods [e.g., tubes of toothpaste]) are eventually sold at the retail level. Lowering interest rates in the absence of voluntary savings will have different effects on higher- and lower-orders of production (Hayek, 1931a). Higher orders of production will have a higher variability or standard deviation (Rothbard, 2000, p. 9). Table 7 below displays the standard deviations of the different orders through Phase 2 (Matrix boom) and Phase 3 (Bust) of the Brazilian cycle.

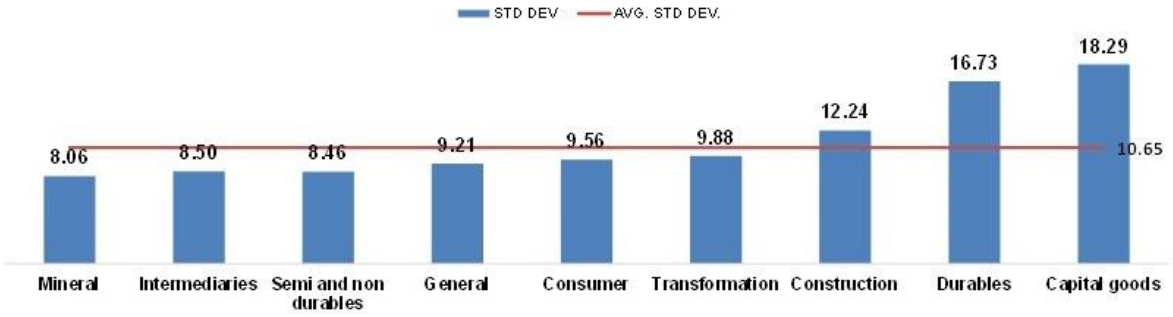
Table 7. Industrial-Production Volatility for Phase 2 (Reset and M-Boom) and Phase 3 (Bust)

Production Stage	**Sector**	**STD DEV**	**MAX**	**MIN**
Higher order	Minerals	8.06	115.00	71.80
Intermediary	Intermediaries	8.50	111.40	75.80
Lower order	Semi- and Non-Durables	8.46	116.00	78.70
-	General*	9.21	112.60	75.80
Lower order	Consumer	9.56	116.30	75.50
Intermediary	Transformation	9.88	113.70	73.70
Higher order	Construction	12.24	110.90	61.10

Higher order	Durables	16.73	119.30	54.70
Higher order	Capital Goods	18.29	127.10	51.60
* All sectors included.				

Figure 10 below reveals that three sectors were above average: Construction, Durables, and Capital Goods. These sectors were clearly the most volatile and represent 75 percent of the higher-order sectors.

Figure 10: Standard Deviation of Industrial Production Among Sectors
Phases 2 and 3: September 2008 to December 2016



Source: Central Bank of Brazil (BCB).

In sum, the results show that Brazil's higher-order sectors experienced the highest growth in Phase 2 and the steepest decline in Phase 3 (the bust) compared to lower-order sectors of production. The one outlier sector is Mineral. Very briefly, this sector is an anomaly because first, its iron-ore subsector is characterized by an unusually high level of export sensitivity. Second, its Petroleum and Natural Gas subsector is subject to extensive government controls which, in this instance, inadvertent as it was, helped it avoid an artificial boom and crash.

MONETARISM AND ABCT IN LIGHT OF THE EMPIRICAL EVIDENCE

The observed facts from the recent Brazilian experience, when compared with monetarist predictions, are as follows.

Table 8. Monetarism Versus the Empirical Evidence

Variable	**T-boom and M-boom**	**Observed?**	**Bust**	**Observed?**
Real GDP (*Q*)	Positive rate of growth (by definition).	Yes, positive rate of growth (Figure 1).	Negative rate of growth (by definition).	Yes, negative rate of growth (Figure 1).

Price level/Inflation (*P*)	Rises, falls, or remains constant (Equation of Exchange).	Yes, rose and fell (Figure 2).	Rises, falls*, or remains constant* (Equation of Exchange).	Yes, rose and fell (Figure 2).
Money supply (*M*)	Rises, falls*, or remains constant* (Equation of Exchange).	Yes, rose (Figure 3).	Rises, falls*, or remains constant (Equation of Exchange).	Yes, rose (Figure 3).
Velocity (*V*)	Stable.	Yes, stable in gradual rise or fall (Figure 4).	Stable.	Yes, stable in gradual rise or fall (Figure 4).
Exchange rate	Loosely rises or falls with the money supply (proposition 2).	Loosely rose with sustained rise in the money supply (Figure 5).	Loosely rises or falls with the money supply (proposition 2).	Loosely rose with sustained rise in the money supply (Figure 5).
Interest rate (nominal)	Rises, falls, or remains constant with expected inflation (proposition 2).	Yes, fell (Figure 6).	Rises, falls, or remains constant with expected inflation (proposition 2).	Yes, rose (Figure 6).
Credit expansion	No prediction.	Not applicable.	No prediction.	Not applicable.
Savings	No prediction.	Not applicable.	No prediction.	Not applicable.
Industrial production of higher-order goods	No prediction.	Not applicable.	No prediction.	Not applicable.
Industrial production of lower-order goods	No prediction.	Not applicable.	No prediction.	Not applicable.
*Possible but highly unlikely scenarios given central-bank norms.				

Table 8 above reveals that 12 out of 12 (100 percent) of applicable expected results from monetarism were confirmed by the data. The observed facts from the recent Brazilian experience, when compared with ABCT predictions, are as follows.

Table 9. ABCT Versus the Empirical Evidence

Variable	T-boom and M-boom	Observed?	Bust	Observed?
Real GDP	Positive rate of growth (by definition).	Yes (Figure 1).	Negative rate of growth (by definition).	Yes (Figure 1).
Price level/Inflation	Rise	Yes, over the long term (Figure 2).	Stable or lower	No, rose and fell (Figure 2).
Money supply	Rise	Yes (Figure 3).	Fall/ Stagnate	No (Figure 3).*
Velocity	No prediction.	Not applicable.	No prediction.	Not applicable.
Exchange rate	No prediction.	Not applicable.	No prediction.	Not applicable.
Interest rate	Fall	Yes (Figure 6).	Rise	Yes (Figure 6).
Credit expansion	Rise	Yes (Figure 8).	Fall	Yes, eventually (Figure 8).
Savings	Stagnate, fall, or rise less than credit expansion	No, rose ~158% 2004-2008, ~14% 2010-2013 (Figure 9)	Rise	No, fell (Figure 9).
Industrial production of higher-order goods	Rise more than lower orders	Yes, except for one sector (Table 8 and Figure 10).	Fall more than lower orders	Yes, except for one sector (Table 8 and Figure 10).
Industrial production of lower-order goods	Rise less than higher orders.	Yes (Table 8 and Figure 10).	Fall less than higher orders.	Yes (Table 8 and Figure 10).

*See CAG for M2 in Table 6 above. While the growth rate of M2 was not negative it was on average a little more than a third of what it was in Phase 1.

Table 9 above reveals that 12 out of 16 (75 percent) of applicable expected results from ABCT were confirmed by the data. The variables that fell outside expectations were price level/inflation, money supply, and savings.

CONCLUSION

This paper intended to analyze the 2004-2016 Brazilian business cycle through the lens of monetarism and Austrian Business Cycle Theory (ABCT). For monetarism, 100 percent of its expected results were confirmed by the data, for ABCT, 75 percent of its expected results were confirmed. Now that the tenets of each model have been sufficiently delineated and examined along with the raw data, the authors can now statistically test the propositions unique to monetarism to further confirm its validity as the optimal paradigm for the Brazilian business cycle(s) occurring in 2004 and 2016.

No doubt some impatient researchers will consider the type of precursory work found in this paper too simple and mundane and thus an "unnecessary step" in research methodology. They may do well to learn or rediscover that careful preparation in any research can end up being a very necessary step to avoiding embarrassment, false hope, and unnecessary labor.

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DOES ONE'S SEX IMPACT PAY – BUSINESS COLLEGES?

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ABSTRACT

Despite significant efforts by the U.S. government to achieve gender equality, gender-based differences in worker compensation persist. Women tend to make less money than their male colleagues in most workplaces. Rather than only considering salary and the sex of the faculty member, this study explores the existence of salary disparities by sex, academic rank, and size of universities within business programs. We discuss the existing trends in-depth and offer some thoughts on the prospects for the future. Findings from our study could inform decision-making and have policy implications for public universities and individual states in the U.S. We base our empirical analysis on data gathered from the faculties in the College of Business of 4-year public universities in one state in the south-central U.S. Controlling for faculty heterogeneity, we use factorial N-way ANOVA for our analysis.

Keywords: pay gap, business faculty, sex, gender equality

INTRODUCTION

Despite significant efforts by the U.S. government to achieve gender equality, sex-based differences in worker compensation persist (Barroso & Brown, 2021). Women tend to make less money than their male colleagues in their corporate jobs and as faculty members (Strittmatter & Wunsch, 2021). The unexplained wage inequalities between women and men have been widely studied for over 50 years using a variety of modeling methodologies to help explain this disparity (Blau & Kahn, 2000; Blau & Kahn, 2017; Goldin & Mitchell, 2017; Olivetti & Petrongolo, 2008; Olivetti & Petrongolo, 2016). Studies show that work establishments are important for creating and maintaining gender equality with differing pay gaps in different settings (Huffman, King, & Reichelt, 2017). Even with the increase in women in academia, male faculty still earn higher salaries than females (Ordway, 2017). In the US, the government is the entity that passes laws to prevent pay disparities based on sex. Hence, one might think that there would not be a pay gap issue when working for a government agency, but there is. While prior studies have focused on pay and sex, we did not limit our study to just these two variables. This study explores the existence of salary disparities by sex, academic rank, and size of universities since we saw that these additional variables might also contribute to salary and might help explain the pay gap between the sexes. We base our empirical analysis on data gathered from the faculty (in the college of business) of all 4-year public universities in one south-central U.S state.

The existing literature on the sex pay gap in the U.S. falls under two main themes. The first focuses on increasing the understanding of existing sex pay gaps while the second focuses on the impact of research methodological choices. We contribute to the first theme by focusing on understanding what factors influence faculty remuneration. We used one dependent variable (salary) and three independent categorical variables (sex, faculty rank, and university size). Controlling for faculty heterogeneity, by keeping our focus solely within business programs, we use factorial N-way ANOVA for our analysis. In this paper, we first present existing related works which drove our research questions in the literature review section. Then we discuss the methodology we use for our analysis, discuss our data selection, and show our findings in the results section. Finally, we summarize our work and give directions for future research in the conclusion section.

LITERATURE REVIEW

Literature

The existence, impact, and measurement of gender pay disparities have been the topic of extensive research for decades (Olivetti & Petrongolo, 2008; Olivetti & Petrongolo, 2016; Strittmatter & Wunsch, 2021). Despite some improvement over the years, studies show that there remains a substantial gap even if a large set of observable characteristics are adjusted for (Blau & Kahn, 2017; Ding, Ohyama, & Agarwal, 2021). Several factors have been found to impact gender pay disparity in work establishments. These include policies aimed at reducing gender inequality in general, especially among lower-wage earners. These studies focused on investigating the pay gap trends over different time intervals, using a variety of analytical models. Although the observed gap is declining, the disparity still exists.

The pay gap further widens for married people and even more for people with children (Goldin & Mitchell, 2017). This is because time-consuming roles are often associated with high wages. However, most individuals find it difficult to combine family life with long hours at work. The impact of marriage and family life on gender wage disparity is especially pronounced in high prestige occupations (Magnusson & Nermo, 2017). This is because such roles often require time-consuming work arrangements; including demands for constant availability, substantial overtime work, and regular business travel. Thus bringing down the pay for married people and especially for married women.

While the existence of gender wage disparity has been well researched for prestigious occupations, there is a need for more granular studies which focus on specific fields. Academia, though prestigious, is also notable for its flexible work schedule with a relatively balanced family and personal life (Crowder & Mouratidou, 2020) as well as having significant control over work travel. Studies however show that even in academia, gender pay disparities persist (AAUW, 2014). A study by Renzulli, Reynodls, Kelly, and Grant (2013) showed institution type and academic rank affect salary interdependently. Further, they found that locations men and women occupy mediate the effect of gender on pay.

Another research (Cha and Weeden 2014) found that overtime work (50 and more work hours per week) and its associated increased wage returns had a significant effect on the gender pay gap. The study found that men were more likely to do overtime work and raise their wages compared to

their female counterparts. The effect of overtime work on gender pay disparity was most pronounced in managerial and professional work environments where working long hours is expected and forms part of the organizational culture. In fact, with the standard workweek being a 40-hour week and faculty reporting working an average of 61 hours per week, this pay gap should also be notable for faculty (Flaherty, 2014). Although faculty are salaried and not hourly employees and thus do not earn overtime for their assigned workload, there are often other opportunities such as teaching an overload or teaching in the summer that does lend itself to salary (overtime) increases. If men tend to work more overtime than women, then we may also see this in academia with men volunteering to work more overtime and thus earning more. As the standard for working long hours was more pronounced in managerial and professional work environments, all faculty whether working as administrators (managers) or in a teaching/research role (professional) should also reflect this pay disparity between men and women in academia.

In the U.S., gender pay disparity has been found to widen with age (more so after 15 to 20 years after school). Within the academic profession, pay increases are primarily tied to tenure-track promotions that are available at scheduled time intervals such as that from Assistant to Associate to Professor. If the pay gap increases with time, then it would also manifest differently at the different ranks. These promotion opportunities are traditionally set at 6-year intervals. To fit this timeline, it would mostly apply to differences between the Assistant Professor to Professor ranks. This could be confounded with the assertion that faculty salaries suffer from inversion and compression (Homer, Hunt, & Runyon, 2020) with newer hires earning more than senior faculty who hold a higher rank and with long time faculty having not received cost of living adjustments in line with inflation yet again in 2021 (Flaherty, 2021). Which is the overriding factor? Where are the largest, if any, of the pay gaps? Are they with newer (more junior in rank) or senior faculty with longer lengths of employment (tied to rank)? This study controls for rank in an attempt to determine which, if any, are the controlling factors in pay disparities.

Just as one's pay can be impacted by the size of their organization, research has shown that the size of a university and the field in which you teach can impact faculty's pay (McCarron, 2021). Whereas McCarron (2021) addresses faculty pay, Keenan (2017) did similar research, but in the corporate arena. Both of these conclude that the smaller the organization one works for, the less one is likely to get paid. McCarron (2021) also postulates that this is driven by the ratio of teaching to research responsibilities. The larger the university, the larger the proportion of research compared to teaching and thus larger salaries at the larger universities. This led us to include a factor to control for the size of the university.

To enter the academic workforce it is desirable to have a terminal degree. Although lecturer positions can be found while only having a Master's Degree, they also pay less than tenure-track positions. Obtaining a terminal degree is a feat that has seen major strides in recent times (Nerad, 2020). The percentage of women who have been awarded doctoral degrees in the US has drastically increased over the years. For example, in the science and engineering fields, women who received their doctoral degrees increased from 13% (1970) to 46% (2018) (Thurgood, Golladay, & Hill, 2006; NSF, 2019) whereas women in business increased from 1.6% to 42.3% during the same period (National, n.d.). In general, women have earned more than 50% of all doctoral degrees in the US since 2006 (Johnson, 2017). Among these women, only a quarter chose to work in the industry rather than academia (NSF, 2019). However, research suggests that

academia has a wider gender pay gap relative to industry (Ding, Ohyama, & Agarwal, 2021). Our study aims to advance knowledge about the observed trend of the gender pay gap in specific academic fields. But which fields, colleges, and universities would provide us with a good control group?

Within universities, pay also is different based on the type of university (Bryant, 2021) being public, private, independent, or religious. Focusing on state (public) universities allows us to eliminate another disparity – public versus private institutions. An examination of the outcomes in pay disparity litigation favors public sector organizations over private with proportionally more cases being found against private than public organizations (Terpstra & Honoree, May 11, 2016). In addition to this litigation disparity, there is also a salary disparity between public and private universities. When focusing on faculty salaries at public versus private nonprofit universities, there is a distinct increase in the pay scales at the private institutions (Characteristics, 2020). Whereas in universities the pay is higher in the private institutions, women in the public sector can earn a significantly higher wage premium than their private sector counterparts (Mukhtarova, Baig, & Hasnain, 2021) which might make up for the observed national lower pay for women. This led us to limit our research to only public institutions to control for these differences.

Refining our research to the public institutions still left many variables to be controlled for. We next examined the influence of minorities. Much research has been done to examine the pay gaps of minorities and alludes to this issue being based on discrimination (Sha, 2019). It is commonly known that both women and minorities earn less than others (Patten, 2016), and in many areas of employment women are the minority sex. But what if we consider an organization where women are not in the minority or majority? Despite the extensive study about existing pay gaps in the U.S., little is known about the impact in disciplines where women are not considered a minority such as in a business college where the ratio is close to even with men making up 52% of the business faculty (Zippia business, n.d.). We argue that, if one of the contributing factors to reducing the wage gap is the proportion of women in the workforce and this proportion gap has been narrowing (Gender, n.d.), then there should be a reduced pay gap in organizations where the percentage of men and women are similar. Our study is intended to help fill this knowledge gap in the existing literature and control for women being in the minority by restricting our research to business college faculty.

Even with refining our research to only public universities and business colleges, there is still a disparity of pay among the different disciplines (McCarron, 2021; Wilson 2018) based on one's department and rank. Within the US, some research suggests that women faculty members generally make less money than their male counterparts (Agarwal & Ohyama, 2013). On the other hand, some research has shown that women who are full professors sometimes earn more than their male counterparts (Chettri, 2021). However, the existence of controlling for other variables was not evident in that research. This leaves us with conflicting research results when considering faculty sex and rank, but consistent trends when considering the university size and limiting the research to business programs in public universities.

Research Questions Derived from Literature

Although it is common knowledge that women in the US make less than men, we wanted to understand more about how this may apply in a university setting when we control for other factors. Is it the person's sex that determines the difference, is it some other factor, or is it a combination of some factors? The prior discussion led us to want to investigate this in a field where there is a fairly equal balance of men and women to avoid the potential bias of women or men being in the minority. This led us to focus our study solely on business colleges/schools.
Our first research question asked whether sex was a determining factor in pay. But we did not want to short-change this study by not controlling for other factors we believed would influence faculty pay. Referring to the discussion we posed in the literature review, we built on this first research question with two more.

Faculty receive pay increases tied to their rank and lecturers earn less than tenure-track faculty. This meant we had to control for faculty rank. But it is also a common belief that the newer faculty are being hired at higher salaries than those already established at a university. As tenure-track faculty apply for promotions in specified time intervals (often 6-year periods), then those with higher rank will have been teaching longer (in general). The answer to this research question would lead us to understand if rank (time teaching) influences pay with the higher ranks earning more or the newly hired earning more (inversion and compression).
The last research question we addressed was related to the type of university. The larger universities tend to require more research from the faculty whereas the smaller universities require more teaching. As research brings in money to the university we believe those teaching at the larger universities might also make more money than those at smaller universities.

Using these three research questions, we add more insight and explain some of the salary disparities with business college faculty that are often attributed to sex discrimination.

METHODOLOGY

In this section, we outline the methodological process of our study. We begin by discussing the data source, the variables, and then the examined relationships in the study. We further discuss the variables we controlled for and the analytical methods considered.

Data

Data were obtained from all but one four-year public university in one state in the south-central of the United States. This state publicly provides the incomes of all faculty as a result of a Freedom of Information (FOIA) request from a local newspaper thus providing census (100%) level data. This data came from the 2018 fiscal year (Arkansas, 2018). That information was cross-checked with all university websites to match faculty information. Where information on salary as well as demographic information about the faculty were both available, these were entered into our data set.

We collected information on sex, rank, university, and the department/college from the universities' websites and cross-checked with other social media such as LinkedIn. The most debatable data might be concerning the individual's sex. We intentionally did not use gender. We began this classification by cross-checking and classifying common first names, uses of sex pronoun terminology from websites, and a visual of the person's image from multiple websites to determine their sex. Many common names such as Bob, George, Henry, Sally, Annette, and Henrietta were clear classification criteria. However, we sought out additional clarifications on names such as Pat, Pu, Shannon, Carol, and Kelli. Our first source was the universities' websites. If the university had a photo of the faculty member, that was used. If not, we attempted to find them on social media. The most often used source was LinkedIn or Google. Some faculty were not able to be identified via these methods either due to a photo not being found or many photos of different people with the same name living in the same area and thus not identifiable. Our final source used in determining the faculties' sex was in print. Often there were articles about the faculty member earning an award, their hiring, their promotion, or article publication. In many of these sources, pronouns were used to address the faculty member as his or her work. Using all of these sources combined, the result was that none were of a questionable categorization allowing us to make a binary determination of the sex (male/female) for all the faculty in our dataset.

We wanted to eliminate any faculty not teaching full time and who had a primary position as an administrator as we felt that might skew the results. We went about trimming our data set by using multiple sources to confirm which employees fit the category of full-time faculty. Faculty rank and position is a good indicator to help determine the full-time faculty, but faculty rank was not listed in the data set we initially obtained. What was listed was a title. Some of these titles identified the employee as an administrator such as VP Enrollment Management. If a person was an administrator and not a faculty member, they were removed from the dataset. We then went to the specific university to determine the faculty members' rank. As different universities' websites are not laid out in the same manner, this was often challenging. A few faculty members whose rank was not clear were verified from other websites – most often their non-university individual web pages or LinkedIn. Faculty who were teaching as adjuncts and not full-time were eliminated from the dataset. The last portion of faculty eliminated were those who were also administrators. These faculty are often 12-month employees and not 9-month employees and sometimes receive a paid stipend for their administrative roles. Had we kept these faculty members in the data, it could have skewed the results as they would have higher pay than a similar rank faculty member at the same university on a 9-month salary and not in an administrative position.

Classifying the university each faculty member belonged to was easy as it was in the dataset. All 4-year public universities in the state were represented in this dataset except one. This one was in the smallest sized category which had four other colleges represented. Its location was physically near other similar-sized colleges. We did not foresee any bias to the analysis by not including data from this one college.

To control for differences in salary from one college to the next, this study wanted to focus on only those faculty who reside in business colleges. To do that, we had to filter the original dataset to include any departments that might not be in a business college and then cross-check it with each university. Some programs such as economics are normally part of a traditional business college. However other classifications such as accounting could be part of the universities' administrative

component or within a business college. Other classifications such as information systems could be housed in a business college or a science, technology, engineering, and math (STEM) college. To ensure we only included faculty from business colleges, every department that could feasibly be in a business college was considered and cross-checked with the universities' websites. Departments such as history were not considered. We also chose not to differentiate between different departments within the business college. We know that pay differs between departments (Wilson, 2018) and this has already been researched and established.

Variables

When considering the plethora of research and conclusions showing that male faculty earn more than women, that women full professors earn more than men, and that faculty earn more at larger institutions, we knew that we needed to control or account for these differences. To better understand our population, we began with the appropriate analysis of the data for descriptive statistics.

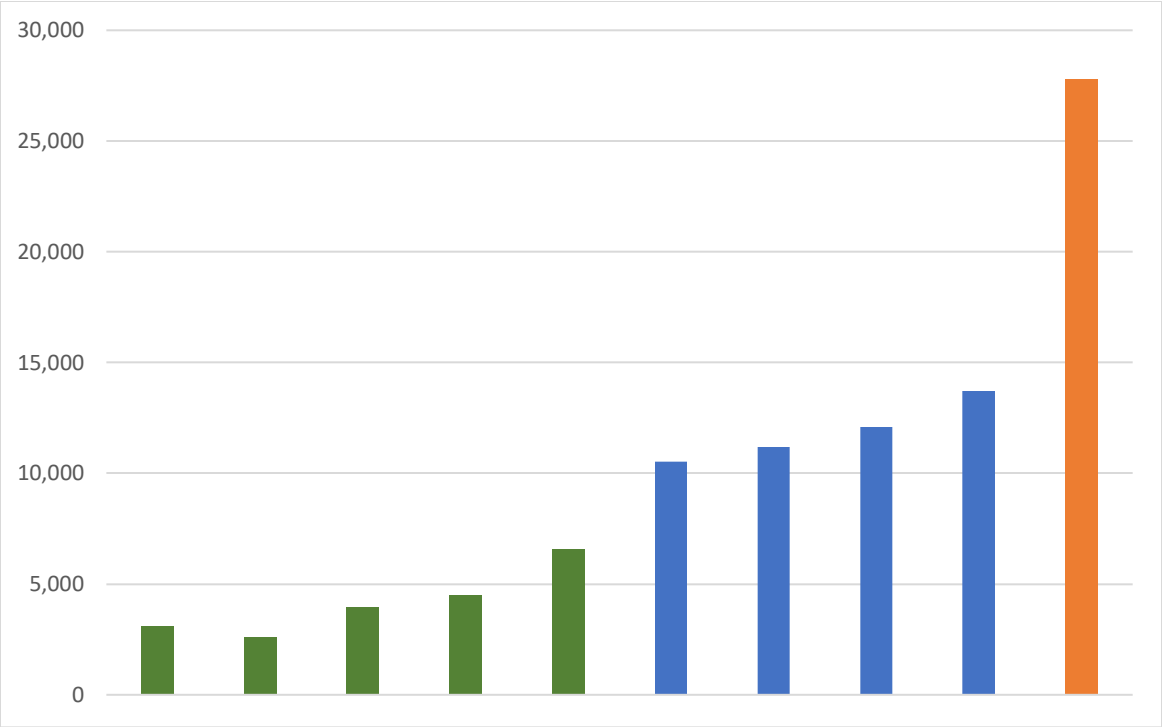
Choosing the analytical tool can be highly debated. While few analysts still use a pencil and calculator, which statistical tool to use is often a decision of familiarity. Although both Statistical Analysis System (SAS) and R (programming language for statistical computing) should obtain the same result, we wanted to use both to satisfy the traditional analyst who might lean towards using Statistical Package for the Social Sciences (SPSS) or SAS as well as the more newly-minted analysts who are experienced in R. We used both SAS and R to analyze the dependent variable (income) while using the hypothesis of interest (sex) and controlling for the other factors (rank and university size). We used "ANOVA" and "lm" functions to apply factorial ANOVA in R. Our main hypothesis is that in a college where the traditional proportion of male/female is more balanced (such as in business schools), we should see an income spread like that in the rest of the United States. But as previously stated other research has concluded both that women can make more and that women make less than men. We feel this is due to some confounding variables such as rank and university size, so these factors were controlled for.

To adequately control for this, we only included faculty that were full-time and not in an administrative role. We also used rank as a control variable. The concern we had was that there has been a trend with salary compression where the recently hired (more likely to be Assistant Professors) are being hired at salaries larger than those who have been at the university for longer periods (Associate Professors and Professors). But regardless of pay being higher at higher ranks or if compression overrides and pay is higher at new hires, controlling for rank should show us which direction the larger pay scales lie.

We also realized that larger universities tend towards being more research-focused with higher salaries and, although they may not be classified by Carnegie as a Tier 1 or a Tier 2 research university, they do tend to pay more and have a smaller teaching load than smaller four-year universities. Thus, to classify the universities we considered the total student population of each of the colleges (CollegeSimply, n.d.). As seen in Figure 1, we saw a clear delineation at the 10,000 and 20,000 student population levels and thus classified the universities by size where 1 is the largest and 3 is the smaller universities. This grouping also matched grouping universities by the Southern Regional Educational Board categories by grouping the Four-Year 1 university, the Four-

Year 2 and 3 universities, and then all of the Four-Year 4 and below universities (Southern, n.d.). As the Carnegie classifications have recently changed to have multiple groupings from the former R1, R2, R3 classifications, we chose to not use these criteria (The Carnegie, n.d.).

Figure 1. Student Population by University.



Methods

Since we were missing one university in the state and since we were interested in applicability outside the one state under study, we chose not to simply report the data, but use statistical measures for inferences. We used measures of central tendency to compare our data by breaking out the income with our factors (sex, rank, and size). This initial exploratory analysis allowed us to understand the relationships and representativeness of the data. Before continuing our analysis, we wanted to ensure our data was representative of our expected population and to understand if there were any gaps or under-represented categories.

We then used N-way analysis of variance (ANOVA) to test for differences as this allows us to study the influence of multiple independent variables on a single dependent variable. We had a numerical (interval) dependent variable and three categorical (ordinal and nominal) independent variables. Since we were studying salary (dependent variable) and wanted to control for sex, rank, and university size, this was the most appropriate statistical method. Factorial ANOVA (UCLA, n.d.) specifically allows us to test and partition this data using the Type I, II, and III sum of squares (SS) (Gottingen, n.d.). We had no missing data (empty cells) so Type IV SS was not necessary as this is the same as Type II when there are no empty cells.

The initial analysis using the measures of central tendency confirmed we had unbalanced data as we expected. This led us to consider the interaction effects and if there were impacts from these. Type I SS lets us know if men or women get paid more. We already know that different studies have concluded both. But, knowing that the different ranks get paid differently and our data was unbalanced at these ranks, we knew we needed to control for that imbalance (Cooper, 2011). We also hypothesized that people at larger universities get paid more and that was also unbalanced and needed to be controlled for. Thus, although we conducted Type I SS, we were not as concerned with that result. We include it in our results to help explain why some analyses might be reporting differences in male/female salary where other research is not. We do note that if there are no interaction effects, then we should rely on Type II over Type III as it will be more powerful. On the other hand, if there are significant interactions, then the main interactions should not be further analyzed.

RESULTS

In this section, we share the results from our methods detailed above. We begin with a descriptive analysis of the data and then provide the sum of squares (SS) full factorial N-way ANOVA while controlling for sex, rank, and university size.

The Data

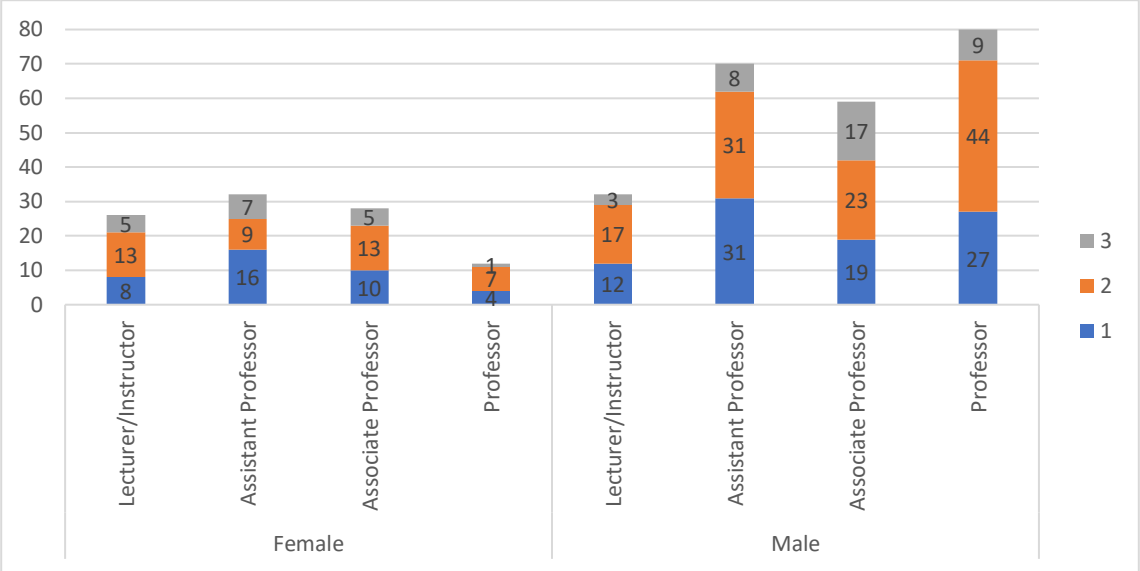
There were 339 faculty members in business colleges in this study. Out of that, 98 were women and 241 were men. Whereas men make up approximately 52 % of the business colleges nationally (Zippia business, n.d.), this data showed men being 71% of the data set. This is contrary to what we expected to see. When we explored the proportion of sex by the different colleges, we found that a similar proportion held with men being 70, 73, and 67% of the population at level 1, level 2, and level 3 colleges. This is only one of the imbalance cases that led us away from using Type I SS.

Typically, university faculty pay is tied to rank (Kelly and Grant, 2012). If men and women are to have equal pay, they should have similar ranks at their universities. The lowest-paid are the non-tenure-track rank of lecturer/instructor where women comprise 45% of the faculty (a higher proportion than any other rank). As we consider the tenure-track ranks women comprise about the same except at the highest rank from 31% of Assistants and 32% of Associates to only 13% of Professors. Because there are fewer and fewer women as the ranks (pay) progress, we would expect to see women making less money than men. If we had only considered this construct, we might associate the pay differences to rank. Doing this would rely on SS Type I results but recognizing the imbalance leads us to not use SS Type I.

When we consider a holistic view of all three factors (sex, university size, and rank), we begin to see a different pattern emerging with more men in the tenure-track and tenured ranks and especially at the highest tenured rank, as seen in Figure 2. Whereas the proportion of female/male lecturers is roughly the same, there are more than twice as many men as Assistant and Associate professors. But the significantly disparate rank was that of Professor where there were more than six times as many men than women. If as we postulate, the larger the university, the more they pay, then we need to look more granularly at the disparities. There may be six times as many men than women

Professors, but there are nine times as many at the largest-sized school. It is these irregularities that we study in this research.

Figure 2. Demographics.



Linear Regression and Interaction

To determine if we should rely on SS Type II or Type III we ran a Linear Regression (LR) using full-factorial model effects and backward elimination. All variables and interactions were eliminated except the interaction term rank * size. These results inform us that we should use SS Type III for our analysis.

Table 1. Parameter Estimates

Parameter	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	104015	9509	10.94	<.0001
CleanedRank*Size Assistant Professor 1	1	35067	10473	3.35	0.0009
CleanedRank*Size Assistant Professor 2	1	-4937	10632	-0.46	0.6427
CleanedRank*Size Assistant Professor 3	1	-25748	12277	-2.1	0.0367
CleanedRank*Size Associate Professor 1	1	60104	11028	5.45	<.0001
CleanedRank*Size Associate Professor 2	1	4318	10750	0.4	0.6882
CleanedRank*Size Associate Professor 3	1	-15351	11469	-1.34	0.1817
CleanedRank*Size Lecturer/Instructor 1	1	-48429	11647	-4.16	<.0001
CleanedRank*Size Lecturer/Instructor 2	1	-35932	10981	-3.27	0.0012
CleanedRank*Size Lecturer/Instructor 3	1	-49379	14265	-3.46	0.0006
CleanedRank*Size Professor 1	1	108955	10937	9.96	<.0001
CleanedRank*Size Professor 2	1	13535	10400	1.3	0.194
CleanedRank*Size Professor 3	0	0	.	.	.

Sum of Squares (SS)

The preliminary study of our descriptive data raised many questions as to if our control variables would produce statistical differences and lend more to the understanding of pay differences. As our excitement arose, we began our more in-depth analysis. We began our SS analysis with our dependent variable (income), our hypothesized variable (sex), and controlling for faculty rank and size of the university. We ran both SS Type I, II, and III. We show the results for Type I. Then we follow with the results for Type II and III which were the same with very slight differences in significance level.

As part of the SS n-way ANOVA, we also looked at Tukey-Kramer to test differences. For sex, it showed no statistical difference when using the 1-way, 2-way, or a full factorial model. For faculty rank, we found significant differences at the 0.01 and smaller for all pay scales for all modeling methods with non-tenure-track being the lowest, then Assistant, Associate, and finally Professor being paid the most. This is a contradiction of the salary compression theory that new hires are paid more than current faculty leading us to conclude that faculty are paid more at the higher ranks. With more men in our dataset at the higher ranks, if we had not controlled for rank, we would conclude that men get paid more rather than acknowledging that people get paid more when they are in the higher ranks.

We also found significance for the size of the university at 0.007 and smaller for all modeling methods with the larger universities paying more and the smaller universities paying less as we hypothesized. As there are more men in the larger universities, had we not controlled for the university size, we might also have concluded that men get paid more than women rather than understanding that it is the size of the university driving the pay differences.
Using an SS Type I with all models, we see that the individual control variables were all significant as were some interaction effects. But this only tells us that there are significant differences for each of these variables. The cause might be the other control variables and that is where SS Type II and III help clarify it for us.

Table 2. Sum of Squares Type I

	Pr > F		
Source	**1-way**	**2-way**	**Full**
Sex	<0.0001	<0.0001	<0.0001
Size	<0.0001	<0.0001	<0.0001
Rank	<0.0001	<0.0001	<0.0001
Sex*Size		0.0010	0.0005
Sex*Rank		0.2479	0.4427
Size*Rank		<.0001	<0.0001
Sex*Size*Rank			0.7076

Although the significance was slightly worse with Type III, both the Type II and the Type III resulted in the same conclusions. Since we know that there is an interaction effect with size * rank, using SS Type III is the appropriate method. There is a difference in pay, but it is due to the size of the university and the rank of the faculty members. In the table, the results show that in any combination of variables when sex is included, the results are always larger than 0.0001 causing

us to reject our hypothesis that sex is a determining factor. When either size or rank is part of the model without sex, the results are significant. This indicates that both the university size and the faculty member's rank as well as combining the information about the university size and the faculty member's rank are determining factors in the faculty members' salary. The results of Type III SS are provided.

Table 3. Sum of Squares Type III

	Pr > F		
Source	**1-way**	**2-way**	**Full**
Sex	0.4026	0.2478	0.3332
Size	<.0001	<.0001	<.0001
Rank	<.0001	<.0001	<.0001
Sex*Size		0.2173	0.3112
Sex*Rank		0.5134	0.6236
Size*Rank		<.0001	<.0001
Sex*Size*Rank			0.7076

CONCLUSION

This dataset is representative of a significant majority of the faculty in the public universities in one state in the south-central United States. Only one university failed to respond to the FOIA (size 2) and all other universities supplied information on all of their faculty. This may limit the applicability of the results to other states as it analyzes data from one state where none of the universities are in a union and all the universities were public universities.

There are differences in business faculty pay, but it is not because of one's sex. Although preliminary research may lead one to think that women get paid less, when you control for other variables, women are not paid less than men due to their sex alone. Our data was imbalanced and if this is not considered, the SS Type I would lead one to conclude that sex is a determining factor in pay. But this is erroneous as the SS Type I should not be used when the data is imbalanced as our data was with more men being in the higher ranks and at larger universities.

Faculty pay differences are due to the size of the university one teaches at and one's faculty rank. Our LR results showed we had an interaction effect and that SS Type III was the appropriate statistical method. Our ANOVA SS Type III analysis showed that when we controlled for the faculty members' rank and the size of the university they taught at, there was statistically no difference in pay between the sexes. When considering either or both the faculty member's rank and/or university size we showed differences in pay. This shows us that both factors alone as well as the interaction variable influence pay. Getting promoted is often out of one's ability to influence, but one can choose to apply to work at larger universities. If one desires to make more money, this would be a wise consideration.

Although there has been recent evidence published on compression of salaries, this study did not indicate that to be true. We found that whether we looked at rank alone or controlled for sex and/or university size salaries increased for tenure-track over non-tenure-track faculty and also increased

from Assistant to Associate to Professor. If compression exists at some universities, it was not apparent for the public universities in the state studied.

We also found support for our hypothesis that larger universities pay faculty more than smaller universities. When controlling for sex and/or faculty rank the largest universities paid more than the medium-sized universities which paid more than the smallest sized universities. Although this was true for the public universities in this state, it may or may not be true for public universities in other states or private universities.

Future Work

Our data did not contain information on how long the faculty had been working in academia or at their current universities. In this data, the more senior women (Associate and Professors) comprise less than half of those categories compared to their male counterparts (for all but one category). Our data did not allow us to determine if these women had been teaching the same length of time as their male counterparts and simply not applying for promotion, or if they had been teaching as long as their counterparts and were being denied promotion. Future research should consider years of teaching and years of teaching at that institution to determine if women are being denied or choosing not to pursue advancement to Professor – the highest paying rank. This could also conclude that more women are relatively early in their careers and just recently reaching those ranks. If this is true, then we may begin to see more women at these higher-pay echelons soon.
As more women were teaching at the smaller universities, additional research is warranted to determine if this was self-selected or if there is some inherent bias at the larger universities. One may ask the following questions: do women not apply to the larger universities at the same rate as men? Do women not get hired at larger universities at the same rate as men? Do women leave the larger universities at higher rates than men? Do women choose to work at the smaller universities and why? Understanding these questions/decisions/processes could lead to a better understanding of the salary differences.

The dataset studied in this research only considered public universities. The pay scale is known to be larger at private universities and private institutions tend to have more litigation for pay disparities for the sexes. Future studies might want to study private university data to see if controlling for these variables has the same results. However, obtaining data from private universities might be difficult.

As studies have shown that minorities are often paid less than the majority demographic and some disciplines have a significant minority of female or male faculty, future studies should consider faculty from different programs where one sex is more of a minority (either female or male). In business programs, faculty are closely split with 52% of the faculty being men (Zippia business, n.d.). With the faculty being pretty evenly split by sex, this could be why the salaries are not different. However other programs are not as equally split such as engineering where 18.5% of tenure/tenure-track faculty are women (Society, n.d.). In nursing programs, there are 76.8% women faculty (Zippia nursing, n.d.). Analyzing programs with such differences in the percent of the sexes may reveal differences in salary by the sexes.

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FEMALE HAIRSTYLE OF SERVICE WORKERS AS A STEREOTYPE TRIGGER

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ABSTRACT

The present work investigated the ability of female hairstyle, as a solitary visual cue, to affect observer inference of wearer occupation, personality, desirability for hiring, and influence ratings on estimated attributes in a service scenario. Faceless pencil drawings of five female hairstyles were presented to respondents at websites, and they clicked the occupation or personality they intuited for each hairstyle from a choice list. For a hiring scenario, respondents ranked hairstyles in order of hiring preference. In a service scenario, respondents rated hairstyles on competency, interpersonal warmth, and anticipated service satisfaction. Hairstyle significantly predicted estimated service occupation and personality. Also, significant differences were found among the hairstyles in a hiring scenario, and for the rated attribute of interpersonal warmth in a service encounter scenario. Only hairstyles typical of young, white women were investigated. Inferences from a combination of hairstyle with other visual elements (such as face, clothing, and accessories) were not explored. Respondent samples were largely female. Results indicate consumers have visual expectations for female hairstyle in the studied service occupations. This effect carried forward into the hiring scenario, suggesting a hiring bias based on hairstyle. It is recommended that service providers pre-test their personal photos for communication effect before posting at provider websites, LinkedIn or Facebook.

Keywords: social cognition, impression formation, relationship marketing, service encounter

INTRODUCTION

The internet has greatly facilitated service provider communication to potential clients. Providers may post credentials, testimonials from past clients, photographs of physical facilities and personal photographs of the provider and staff at a provider website. Potential clients may visit the site of the provider (and competitors) during the information search phase for their service need. The importance of this "pre-core" service encounter period has recently been emphasized because it has the effect of leading potential clients to engage with the service provider in the "core" service encounter (Voorhees et al., 2017).

Of the elements at a service provider's website, personal photographs of the provider and staff and the effect of these photographs on potential clients are particularly intriguing. Posting personal photographs at websites enhances social presence (the extent to which visitors to the site perceive another as psychologically present) and the photos may lay a foundation for relationship marketing (Gefen & Straub, 2004). However, personal photos at a provider's website may entail some risk to the provider. Observers spontaneously form trait judgments about another from facial appearance (Klapper, Dotsch, van Rooij & Wigboldus, 2016) and this process requires only 100 milliseconds (Willis & Todorov, 2006). In a sample of 535 people, 75% reported that it was possible to know some (or all) of a person's personality traits from reading their face (Hassin &

Trope, 2000). The outcome of this face reading process could be favorable (or not) for the service provider.

The inference process referred to above is not limited to individual traits intuited piecemeal; stereotypes may be employed as well, and they have a far richer set of associations (Fiske, 1993). The essence of stereotyping is that a person is categorized as belonging to a particular group based on the perceived presence of a common characteristic (ethnicity, gender, body type, occupation, etc.) and then characteristics associated with that group are attributed to the person rather than assuming individual variation. Perhaps the most pernicious effect of stereotyping is that characteristics attributed to a person in error have been demonstrated to alter subsequent interaction between observer and target in such a way as to confirm the initial erroneous attribution (Snyder, Tanke & Berscheid, 1977). Within the pre-core service encounter context, the implication is that a stereotype triggered by a personal photograph or other stimulus at a service provider's website could have an unfavorable effect, causing the potential client to remove the provider from consideration or modifying initial interaction between the two.

There is a body of research based on consumer first impressions of un-met service providers (Bebko, Sciulli & Garg, 2006; Dean, 2021; Krishnan, Niculescu & Fredericks, 2019; Naylor, 2007; Vilnai-Yavetz & Rafaeli, 2011), but the photographic or video stimuli used in these studies was 'rich' content material. That is, stimuli included faces, clothing, and accessories. The present investigation is focused on the ability of a solitary visual cue, female hairstyle, to influence observer inferences and activate stereotypes. This is a relatively 'lean' content stimulus. Still, the premise for the current work is that female hairstyle alone will be enough to trigger inferences and stereotype attributions about the wearer of the style. This premise is explored in a pre-test and series of four studies. Female hairstyle was chosen as the focus because it is more variable than male hairstyle, and because female hairstyle is generally considered to be expressive of the individual. Additionally, a recent review of stereotypes in services has called for investigation of more subtle stereotype triggers (Fleischer, 2020) and female hairstyle has not previously been investigated as a stereotype trigger within a services marketing context.

BACKGROUND

Stereotypes in Services Marketing

The literature on stereotypes in services marketing has tended to focus on stereotypes applied to employees based on a relatively few broad categories. These categories include: gender (Pinar, Wilder, Shaltoni & Stuck, 2017; Smith, Martinez & Sabat, 2016), obesity (Smith et al., 2016), ethnicity (Krishnan et al., 2019), attractiveness of the employee (DeShields, Kara & Kaynak, 1996; McColl & Truong, 2013), provider nationality (Harrison-Walker, 1995), and employees with tattoos (Arndt, McCombs, Tolle & Cox, 2017).

The effects of the stereotypes mentioned above may be summarized. Men are perceived to offer better service than women (Pinar et al., 2017). Obese women were perceived to rate higher in interpersonal warmth than less heavy women, with no effect for men (Smith et al., 2016). Facial attractiveness of the salesperson significantly affected satisfaction at the time of the service encounter (McColl & Truong, 2013). Salespeople with a same-national accent created higher

purchase intentions than foreign-accented salespersons (DeShields et al., 1996). Managers worry that tattooed employees might impair the image of the business (Arndt et al., 2017). As mentioned earlier, a recent review of stereotypes in services has called for more research on stereotypes based on additional categories and stereotype triggers (Fleischer, 2020).

Effects on Estimated Service Satisfaction

Inferences and stereotypes attributed to unmet service workers have been shown to have practical implications. In the study of Bebko et al (2006), subjects were shown a photograph of a service provider (bank teller, nurse, salesperson) and asked to predict interpersonal and professional skills as well as service quality from the employee. Interpersonal skill judgments were related to predicted provider quality on the dimensions of Responsiveness and Assurance while professional skill judgments were related to predicted outcomes on Reliability, Responsiveness, and Empathy. The study demonstrates that consumers are easily able to estimate service quality based on a static photograph of the service provider.

In the study of Vilnai-Yavetz and Rafaeli (2011), subjects were shown video clips of a male bank employee at a desk who was alternately either slouching, rumpled, and untidy versus a more professional appearance. Engagement intent toward the employee was more favorable in the professional appearance condition. This and the study of Bebko et al (2006) indicate that consumers are, indeed, behaving similarly to their conceptualization as "detectives" in the way they process and organize clues to estimate anticipated service satisfaction (Berry, Wall & Carbone, 2006, p. 43).

Triggers of Inference and Stereotypes

The cues that may trigger trait inference and activate stereotypes include those previously mentioned (gender, obesity, ethnicity, physical attractiveness, and the presence of tattoos) but there are others. First impressions of people may result from a wide variety of other cues, including body language, facial expression, eye gaze, height, hair, and artifacts such as clothing, jewelry, and accessories (Naylor, 2007). Although there is an abundance of potential cues for social cognition and stereotyping, the present investigation is focused on the specific cue of female hairstyle.

Hair as a Cue for Inference and Stereotyping

Hair length and color have been the topic of several studies. The first (Baktay-Korsos, 1999) classified girls from primary schools in Hungary as having either long hair (shoulder length or longer) or short hair, followed by a questionnaire investigating the socio-dynamics of the groups (who do you like best in the class, who is your best friend, who is nicest, and who in the class is most popular). Results showed that longhaired girls were significantly better liked, had more friends, and were perceived as more popular than shorthaired girls. A follow-up study by the same researcher (Baktay-Korsos, 2000) using a bald dress-me-doll activity found that both girls and boys preferred long hair for the girl doll and short hair for the boy doll; however, blonde hair was preferred for the girl doll and brown or black hair was preferred for the boy doll. In a study of inference from hair color using subjects from the Southeastern U.S., Watson, Griggs, and Szeman (2020) photo-shopped hair color (brunette, blonde, red) on the same face (male, female) finding

that redheads, compared to blondes and brunettes, were rated as significantly less attractive, significantly less effective at supervising others, and significantly less likely to be hired. Collectively, these studies indicate a generally favorable effect for long hair for women, and a generally unfavorable effect for red hair for both genders.

The study of Bereczkei and Mesko (2006) differs from the above in focusing on the effect of female hair length and facial attractiveness on the inference of a larger number of personal attributes. The authors photo-shopped different hair styles on the same female face, pre-tested to be either attractive or less so. Their findings confirm a generally favorable influence of long hair across the two face conditions, with the long hair condition having significantly higher ratings than the short hair condition on intelligence, dominance, health, and femininity. This is an important study for the present because it indicates that variability in female hairstyle as the sole visual cue (hair color was not manipulated), may alter inferred traits of the wearer. The present investigation is a logical extension of the study of Bereczkei and Mesko (2006) exploring the possibility that female hairstyle may have additional effects on the social cognition of observers within a services marketing context.

THE CURRENT INVESTIGATION

The present study is a conceptual extension of the work of Bereczkei and Mesko (2006) investigating the influence of female hairstyle on social cognition of the observer within a pre-encounter services marketing context. This line of investigation does not appear to have been previously reported. Yet, it is believed to be worthwhile because if female hairstyle, alone, can influence certain perceived personal attributes, as shown in the work of Bereczski and Mesko (2006), then it is likely that this visual cue affects other attributes more directly related to a services marketing context. If this is the case, then service providers will want to know these effects. Many providers post personal photographs at their business website, on their business cards, or at LinkedIn or Facebook, and prospective customers may come across these photos in their search for a provider. Inferences about an un-met provider are likely important in provider selection during the search phase. If particular female hairstyles have unfavorable effects on inferences and stereotyping, service providers may take pre-emptive action, as hairstyle is a relatively easy physical feature to alter.

The present investigation is limited to female hairstyles typical of young white women. The rationale for this was to exclude ethnic hairstyle as a potential confounding factor. For example, studies indicate that Black women with Afrocentric hairstyles are perceived as less professional than Black women with a eurocentric hairstyle (Mullen, 2020; Opie & Phillips, 2015). Additionally, the 'penalty' imposed for wearing Afrocentric hair was greater when the evaluator was Black as opposed to white (Opie & Phillips, 2015). These findings suggested that including ethnic hairstyles as part of the stimuli could lead to stereotype activation and interactions beyond that of the intended scope of the study.

HYPOTHESES

Based on the current understanding of the social cognition process and stereotyping and the literature cited above, the following hypotheses are proposed. They are based on pencil drawings

of female hairstyles on a faceless white women as stimuli and a list of service occupations or personality profiles to choose from.

H1: Hairstyle will be significantly associated with occupation (evidence for hairstyle activating occupational stereotype).

H2: Hairstyle will be significantly associated with personality profile (evidence for hairstyle activating personality stereotype).

H3: Ranking the hairstyles for hiring preference for a particular service occupation will result in a significant difference in rank sums among the hairstyles.

H4: Rating each hairstyle in a service scenario on the attributes of competency, interpersonal warmth, and anticipated service satisfaction will result in significant differences among the hairstyles.

PRETEST

The pretest was intended as a 'proof-of-concept' that female hairstyle, as a sole visual cue, could trigger an occupation stereotype in the mind of the observer.

Methods

Black and white drawings of female hairstyles were sourced from the public website https://www.deviantart.com/styrbjornandersson/art/manga-girl-hair-reference-sheet-II-20130113-348275702. The webpage is a collection of eight pencil drawings by Swedish artist Styrbjorn Andersson. Five styles were chosen and used for all studies in the current investigation (shown in Figure 1). The artwork is reproduced courtesy of the artist. Conversational labels for the five chosen styles are: mid-length disheveled, long with bun, short pixie-spike, shoulder-length with bangs, and long with braids on both sides. Visually, the hairstyles look somewhat like wigs on a faceless, Styrofoam manikin head.

Hairstyle images were copied from the website and presented individually on paper to a small group of students and staff from the author's institution in the Appalachia area of the U.S. with a list of six service occupations to choose from (shown in Table 1). Subjects were instructed to choose the one occupation from the list they believe most likely for each image, assuming the image could come to life. The images and service occupations were not presented as a matching exercise; subjects could choose the same occupation for multiple images and there was also a "none of the above" choice in the occupation list.

Along with some demographic items, the remainder of the questionnaire asked subjects to think how they came to associate an image with the particular occupation they chose. The answer choices available were the following: a) I really do not know, b) the drawings reminded me of women I have seen in these occupations in my personal experience, c) the drawings look like women in these occupations as depicted in movies and the media, d) I imagined the personality of the woman in the drawing and then tried to match that personality to an occupation, and e) the depicted

hairstyle reminded me of a woman I have known and my emotion toward that person (positive or negative) guided my choice.

Figure 1. Hairstyle drawings used as stimuli for all studies

Note: Artwork is reproduced with permission from the artist, Styrbjorn Andersson. Working labels for the styles are (from left to right): medium length disheveled, long length with bun, short length pixie-spike, shoulder length with bangs, and long length with braids on both sides.

Results

The 16 member sample was 75% female, 44% ethnic minority, and the sample had a mean age of 23.88 years with a standard deviation of 12.42 years.

Questionnaire responses were input into SPSS and analyzed with the asymmetric lambda coefficient, designating hairstyle as the independent variable and occupation as the dependent variable. A crosstabs of hairstyle and occupation is shown in Table 1. The lambda coefficient is a measure of nominal association ranging between 0.0 and 1.0. The coefficient is interpreted as the reduction in error for the dependent variable by knowing the label of the independent variable (similar to R-Squared in regression). For Table 1, lambda is .44 ($p < .001$), indicating a 44% reduction in error of predicting occupation by knowing the hairstyle. In looking at the frequency counts in Table 1, the greatest consensus in associating a hairstyle with a particular occupation is seen for the most expressive hairstyles (short pixie-spike and long with braids on both sides).

There was a general lack of consensus to the multiple-choice question of how the respondent came to associate a particular hairstyle with a particular occupation. One person replied that they did not know, five people said it was through personal experience with women in the listed occupations, four subjects said the drawings looked like how women in those occupations were portrayed in movies and media, four respondents indicated they had imagined the personality of the woman with the hairstyle and tried to match personality with occupation, and two people said the hairstyle reminded them of a women they had known and emotion toward that person guided their choice.

Table 1. Crosstabs of frequency counts for hairstyle stimuli and expected occupation if the hairstyle could come to life, n = 16, Pretest

	Hairstyle				
Occupation	Medium length disheveled	Long length with bun	Short length pixie-spike	Shoulder length with bangs	Long length with braids both sides
Clinical psychologist	6	2	0	6	0
Concierge at upscale hotel	3	3	0	6	1
Barista at Starbucks	2	9	0	1	2
Accountant	5	1	0	3	0
Dog groomer	0	0	2	0	12
Bartender	0	1	10	0	0
None of the above	0	0	4	0	1

Note: Occupation dependent lambda for the crosstabs is .439, $p < .001$

Discussion

The results of the Pretest are consistent with the premise for the investigation, the idea that particular hairstyles, as the sole visual cue, are associated with particular occupations. There appears to be a visual stereotype, in the mind of the observer, for women in service occupations and what the typical hairstyle of a member of that occupation should look like. However, it is unclear how subjects came to associate certain hairstyles with particular occupations, as subjects could not agree on one source. This suggests there may be multiple sources for visual stereotypes.

STUDY 1

This study was designed as an extension of the Pretest, using a larger sample, and changing some of the service occupation choices in an effort to increase generalizability.

Methods

Female hairstyle images were sourced as described in the Pretest. The major change in methods from the Pretest was that the images and associated questions were posted at the survey-hosting site *SurveyGizmo*, and subjects were recruited through e-mail solicitation to visit the site and respond. This was necessary, in part, due to COVID-19 restrictions at the time, but an electronic interface with respondents also facilitated data management, as their responses were easily exported out of the site as an Excel file and imported into SPSS for further analysis.

A list of e-mail addresses was obtained by requesting addresses for all students, staff, and faculty at the author's university (4,985 e-mail addresses, essentially all users of the university e-mail system). Addresses for certain individuals (members of the Institutional Review Board, or others believed to have knowledge of the goals of the study) were deleted from the list. The result was a slightly truncated master list.

To ensure that an e-mail address was used only once and individuals were not solicited for any other studies in this project, addresses were cut from the list in Excel and pasted into the blind carbon copy box in Outlook. This cutting and pasting process resulted in an ever-shrinking list of potential respondents for subsequent studies. Following this protocol made certain that an e-mail address was never reused. Solicitation e-mails were sent out in batches, continuing until an adequate number of responses was obtained.

Results

Of 531 e-mails sent, 70 respondents entered the website and completed the survey, yielding a response rate of 13.18%. Female respondents were 66% of the sample, minorities were 18.6% of the sample, and the sample had a mean age of 35.43 years with a standard deviation of 15.17 years.

Responses were exported out of *SurveyGizmo* in Excel format and imported into SPSS for analysis with the asymmetric lambda coefficient, designating occupation as the dependent variable. A crosstabs of hairstyle and occupation is shown in Table 2. For Table 2, lambda is .28 ($p < .001$), indicating a 28% reduction in error of predicting occupation by knowing the hairstyle. The results support H1, which predicted a significant association between hairstyle and intuited occupation. As in the Pretest, the greatest consensus in associating a hairstyle with a particular occupation is seen for the most expressive hairstyles (short pixie-spike and long with braids on both sides).

Discussion

The results of Study 1 are consistent with those of the Pretest, and both support the general premise for the investigation, the idea that particular hairstyles are associated with particular occupations. Specifically, results from Study 1 suggest that respondents have a visual stereotype for what the hairstyle of a female service worker in a particular occupation should look like. If this were not true, then the frequency counts in each column in Table 2 would be about equal for each row. Clearly, that is not the case, as the frequency counts are clustered in particular rows.

Table 2. Crosstabs of frequency counts for hairstyle stimuli and expected occupation if the hairstyle could come to life, n = 70, Study 1

	Hairstyle				
Occupation	Medium length disheveled	Long length with bun	Short length pixie-spike	Shoulder length with bangs	Long length with braids both sides
Elementary school teacher	33	23	4	24	9
Concierge at upscale hotel	6	22	3	22	2
Punk rock musician	6	3	47	2	1
River raft guide	5	4	9	3	38
Dog groomer	14	13	2	10	15
None of the Above	6	5	5	9	5

Note: Occupation dependent lambda for the crosstabs is .280, $p < .001$

Explained variance in Study 1 (28%) is less than that in the Pretest (44%). Although the same five hairstyle images were used in both, the occupation choices differed between the two, and this might account for a difference in explained variance. A limitation of Study 1 is that respondents were predominately female (66%). Subjects self-selected into the study from e-mail solicitation; apparently, women found the topic of the research more interesting than did men.

STUDY 2

The objective for Study 2 was to investigate whether consumers associate a particular hairstyle with a particular personality profile. If so, this would be evidence for hairstyle, as a visual cue, triggering a personality stereotype in the mind of the observer.

Methods

Hairstyle images were sourced as in Study 1. A series of five personality profiles were constructed based on combinations of Myers-Briggs Type Indicator (MBTI) dimensions and presented with each hairstyle for the association task. The objective in constructing the personality profiles was to generate a diverse mix of traits among the set. The profile statements presented to respondents were the following: a) outgoing, uncritical, live for the moment, dislikes routine, and restless when

still, b) gracious and effective in dealing with others, in-tune with individual needs, and OK with routine, c) true to own ideals, strives for self-identity, and resists being labeled, d) able to inspire and motivate, easily organizes and makes decisions, and e) caring and dependable, does not seek attention, and has a high sense of duty.

Similar to Study 1, a webpage was set-up at *SurveyGizmo* and faculty, staff, and students from the author's university were recruited to go to the survey webpage through an e-mail. In the survey, respondents encountered each hairstyle separately, with instruction to click the personality description from the list they believed most likely for that person. The list of profiles also included a "none of the above" choice. The survey concluded with demographic questions.

Results

Of the 567 e-mails sent, 66 respondents entered the website and completed the survey, yielding a response rate of 11.6%. Female respondents constituted 77% of the sample, and minorities were 10.6% of the sample. The sample had a mean age of 32.83 years with a standard deviation of 14.75 years.

Responses were exported out of *SurveyGizmo* in Excel format and imported into SPSS for analysis with the asymmetric lambda coefficient, designating personality as the dependent variable. A crosstabs of hairstyle and personality is shown in Table 3. The lambda coefficient for Table 3 is .17 ($p < .001$), indicating a 17% reduction in error of predicting personality by knowing the hairstyle label. The frequency counts in Table 3 show much less consensus within columns compared to Study 1, indicating respondents had less agreement in their personality judgments for the hairstyles. Although the lambda coefficient is weaker than in Study 1, it is still highly significant, supporting H2. That is, subjects associate different hairstyles with different personalities.

Discussion

A recurring theme in the results of Studies 1 and 2 is that the most expressive hairstyles (short pixie-spike and long with braids on both sides) have the most consensus among observers in judging occupation and personality profile, respectively. Also, results of both studies support the general premise that female hairstyle is a visual trigger for stereotype activation.

Service provider traits of extroversion, conscientiousness and agreeableness, as perceived by customers, have been found to predict interaction quality within a service encounter (Ekinci & Dawes, 2009). Since subjects in Study 2 were able to intuit personality profiles of the wearer from images of hairstyles, this suggests that visitors to a service provider's website might be inferring personality traits of the depicted provider, based in part on hairstyle, and determining who to keep (or not) in their consideration set.

Table 3. Crosstabs of frequency counts for hairstyle and expected personality if the hairstyle could come to life, n = 66, Study 2

	Hairstyle				
Personality profile	Medium length disheveled	Long length with bun	Short length pixie-spike	Shoulder length with bangs	Long length with braids on both sides
True to own ideals, resists being labeled	6	8	38	3	7
Gracious and effective in dealing with others	11	19	0	19	13
Outgoing, uncritical, live for the moment	12	7	21	4	14
Able to inspire and motivate	12	10	1	19	8
Caring and dependable, but does not seek attention	18	14	2	16	19
None of the Above	7	8	4	5	5

Note: Personality dependent lambda for the crosstabs is .170, $p < .001$

STUDY 3

The objective in Study 3 was to change the context of observation of female hairstyle and inference in two fundamental ways. First, in Study 3, the context is comparative rather than individual evaluation (as in previous studies) because the entire set of five hairstyles was presented as a set for ranking. Second, the context was changed from non-personal to a personal context – respondents were playing the role of a manager ranking job applicants for suitability for being hired as a river raft guide for a business they owned.

It should be mentioned that the goal of Study 3 was not to simulate actual hiring by a manager, as this would require managers as respondents. Rather, the study was designed to explore the effect of female hairstyle as a stereotype trigger in a personal context. The situation resembles how a

consumer might review the images of multiple service providers at different provider websites and then choose a provider for their particular need. In effect, the consumer is 'hiring' the service provider.

Methods

Similar to previous studies, a webpage was set-up at *SurveyGizmo* and faculty, staff, and students from the author's university were recruited to go to the survey webpage through an e-mail. Unlike the previous studies, hairstyle images were presented as a set (with capital letter labels A through E) and respondents were asked to assume the role of a manager and rank the hairstyles (assuming they could come to life) for suitability to be the manager's employee (rank 1 = most desired, rank 5 = least desired). The manager's role was that of owner of a business that provides river raft excursions, hiring a river raft guide.

Results

A total of 670 e-mails were sent, and 69 respondents entered the website and completed the survey, yielding a response rate of 10.3%. Female respondents were 72% of the sample, and minorities were 26% of the sample. The sample had a mean age of 27.57 years with a standard deviation of 11.68 years.

Responses were exported out of *SurveyGizmo* in Excel format and imported into SPSS for Friedman's Rank Sum analysis. Analysis indicated a significant difference among the rank sums ($\chi^2 = 56.06$, df = 4, $p < .001$), see Table 4. The hairstyle most desirable to hire as a river raft guide was long hair with braids on both sides. This is consistent with the results of Study 1, in which a different sample looking at this hairstyle intuited river raft guide as the most likely occupation. Computation of the least significant rank sum difference for use in multiple comparisons (Hollander & Wolfe, 1973, p. 151) was determined to be 50.67, indicating that the long hair with braids style and disheveled style are both significantly more desirable as employees than the long hair with a bun style and the shoulder length hair with bangs style. The results support H3, which posited a significant difference in rank preference in a hiring scenario.

Discussion

The results of Study 3 are interesting in that they reveal a strong influence (arguably a bias) in a hiring situation based solely on female hairstyle. The results support the overall premise that physical appearance of a service provider (and specifically hairstyle) viewed at the website of the provider might affect inclusion of that provider into the consideration set of the viewer for their service need. It remains unclear why the long hair with braids style and disheveled style are significantly preferred over the other styles in a river raft guide. Perhaps these styles connote 'nature' or 'outdoors' in the mind of respondents while the other styles are more associated with 'indoors' activities.

Table 4. Rank sums for hairstyles in a hiring scenario for a river raft guide, if the hairstyle could come to life, n = 69, Study 3

	Hairstyle				
	Medium length disheveled	Long length with bun	Short length pixie-spike	Shoulder length with bangs	Long length with braids both sides
Rank Sum	181	236	191	276	151

Note: The Friedman test Chi-Square for Study 3 is 56.06, $p < .001$, and the least significant difference among rank sums for multiple comparisons is 50.67

STUDY 4

Results from Studies 1 and 2 have suggested that viewing faceless hairstyle images activates stereotypes for occupation and personality, respectively. Further, Study 3 indicates that hairstyle image, in the absence of other information, significantly influences hiring preference for a service provider. The goal of Study 4 was to investigate the effects of hairstyle images more specifically to a service encounter scenario. Similar to Study 3, the context of Study 4 is personal, respondents are judging the hairstyles in a hypothetical service encounter, assuming the hairstyle could come to life, but unlike Study 3, the styles are being judged individually rather than being ranked against each other.

Methods

Similar to previous studies, a webpage was set-up at *SurveyGizmo* and faculty, staff, and students from the author's university were recruited to go to the survey webpage through e-mail. Hairstyle images were sourced as previously described. Respondents were instructed to imagine that each hairstyle they encountered could be the person serving them (the barista) at a Starbuck's coffeehouse. Hairstyle images were presented individually with instructions to rate each style on the following three attributes: competence (competence, job knowledge, and efficiency in performance), interpersonal warmth (interpersonal warmth and sincerity), and anticipated satisfaction with the image as their service provider. Single scales for each attribute were constructed as 'sliders' ranging from 1 to 10 with 0.25 increments and with 1 as the unfavorable end of the scale. Anchors for the scales were as follows: very incompetent/ extremely competent, very cold, insincere/ very warm, sincere, and extremely dissatisfied/ extremely satisfied.

Results

A total of 1,479 e-mails were sent, and 41 respondents entered the website and completed the survey, yielding a response rate of 2.8%. Female respondents were 76% of the sample, and minorities were 27% of the sample. The sample had a mean age of 23.80 years with a standard deviation of 11.14 years.

The response rate for Study 4 is rather low, and lower than that for the previous studies using a similar recruitment method. During the recruitment time period, the author was contacted by the cybersecurity officer of the university to say that security monitoring software had 'read' the survey URL being sent out in the solicitation e-mail as a phishing attempt, and the URL was being automatically disabled. The cybersecurity officer asked the author to cease sending out any more e-mails with the same domain name as the URL. These events appear to explain why the response rate was so low, as the recipient of the e-mail would have to manually copy and paste the URL from the e-mail into a browser to respond, assuming the solicitation e-mail was not shunted into the quarantine folder.

At the time of cessation of recruitment, 41 responses had been obtained. This was a smaller sample size than intended, but the uncertainty of the ongoing cybersecurity issue suggested termination of study enrollment. Responses were exported out of *SurveyGizmo* in Excel format and imported into SPSS for Friedman's Test analysis. This analysis is the non-parametric analogue to One-Way ANOVA with related samples; it does not assume that the dependent variable is normally distributed. It may be applied to either ordinal or interval level data. In Study 3, the data was ordinal, but in Study 4 the data is interval. Separate Friedman's Tests were conducted for each of the three scaled attribute measures. As in One-Way ANOVA, the test is an omnibus flag for a significant difference among any two groups. Results are shown in Table 5.

The Friedman's Test for perceived competence was not significant ($\chi^2 = 9.02$, df = 4, p = .061). However, the test for perceived interpersonal warmth was highly significant ($\chi^2 = 23.25$, df = 4, p < .001). As with One-Way ANOVA, a significant omnibus flag requires post-hoc tests to determine which groups differ from each other. In this context, the post-hoc analysis is the Wilcoxon Signed Ranks Test in SPSS. With five hairstyles, there are 10 possible pair combinations, and so the significance criterion becomes a p-value of less than .005 due to Bonferroni adjustment for the number of planned comparisons. Post-hoc tests for interpersonal warmth indicate that the medium length disheveled hairstyle has significantly less perceived warmth than the shoulder length with bangs style (p = .003) and the long length with braids on both sides style (p < .001). Additionally, the short length pixie-spike style has significantly less perceived warmth than the long length with braids on both sides style (p = .004). The omnibus Friedman Test for anticipated satisfaction with the service was not significant ($\chi^2 = 4.30$, df = 4, p = .367). Accordingly, H4, which proposed significant differences among the hairstyles on all three attributes, is not supported.

Discussion

The results of Study 4 are mixed. On the one hand, there is strong evidence that the hairstyles significantly differ in perceived interpersonal warmth, but this was not true for perceived competency or anticipated service satisfaction. The results may have been influenced by the choice of service scenario. An encounter with a barista at a coffeehouse was chosen to be realistic to respondents who were anticipated to be of relatively young age. However, had the scenario involved the service of a clinical psychologist, a medical professional, or an attorney (service experiences where interpersonal warmth might be weighted more heavily by the consumer) the outcome for anticipated service satisfaction may have been different.

Table 5. Attribute judgments of hairstyles, assuming the style could come to life as the barista serving you at a Starbuck's coffeehouse, n = 41, Study 4

	Hairstyle				
Attribute	Medium length disheveled	Long length with bun	Short length pixie-spike	Shoulder length with bangs	Long length with braids both sides
Competence, job knowledge and efficiency	6.70 1.75	6.63 2.28	7.09 2.36	6.35 2.06	7.18 2.00
Interpersonal warmth and sincerity	6.11 1.89	7.14 2.23	6.33 2.35	6.87 1.95	7.72 1.91
Anticipated service satisfaction	6.72 1.97	6.80 2.00	7.26 2.27	6.71 2.16	7.33 1.99

Note: Cell entries are means and standard deviations, all measures were 1 to 10 scales with 0.25 increment response values. Omnibus Friedman Test results are as follows: Competence (χ^2 = 9.02, df = 4, p = .061), Interpersonal Warmth (χ^2 = 23.25, df = 4, p < .001), Anticipated Satisfaction (χ^2 = 4.30, df = 4, p = .367)

GENERAL DISCUSSION

Responding to a call for investigation of more subtle triggers of stereotypes in services marketing (Fleischer, 2020), the present investigation finds that female hairstyle, as a solitary visual cue, appears to trigger a service occupation stereotype in the mind of the observer (Study 1). This is based on the finding that particular hairstyles were significantly associated with particular occupations for these hairstyles in a non-random way. These results are especially applicable to the pre-core service encounter period (Voorhees et al., 2017), a time when consumers are searching the internet for a service provider. If the photo of the service provider at the provider website, LinkedIn or Facebook, does not match the visual expectation for the provider in the mind of the consumer, the provider might be discarded from the consideration set.

Study 2 presented evidence that female hairstyle, as a solitary visual cue, triggers a personality stereotype for the wearer of the hairstyle. This is also applicable to the pre-core service encounter period. It has been shown that consumer perceived personality traits in the provider (extroversion, agreeableness, and conscientiousness) have a favorable impact on service interaction quality (Ekinci & Dawes, 2009). If a prospective client views a photo of an unmet provider on the internet and infers poor ratings on these personality traits, then the prospective client might never engage the provider.

Unlike Studies 1 and 2, which presented female hairstyles to subjects in a non-personal, categorization activity, Study 3 asked respondents to assume they were the owner of a river raft excursion business, and the five faceless hairstyles were candidates for a river raft guide employee

job. The significant differences found in Study 3 for hiring desirability among the hairstyles suggests a more personal effect of the visual cue – a hiring bias. Additionally, it may be noted that Studies 1 and 3 are consistent with each other, in that the hairstyle most desired to hire as a river raft guide in Study 3 was intuited by a majority of respondents in a different sample in Study 1 to be a river raft guide. This suggests that occupational stereotype activation by the visual cue of hairstyle may have been the basis for hiring bias.

The results of Study 4, however, are mixed and less easily integrated in interpretation with those of earlier studies. This study asked subjects to look at each of the five hairstyles and, assuming the hairstyle could come to life and be their barista at a coffeehouse, rate each hairstyle for perceived competence, interpersonal warmth, and anticipated service satisfaction. Multiple significant differences were found among the five hairstyles on the attribute of perceived interpersonal warmth, but not for the other two measures. The study is interesting for the discovery that female hairstyle can communicate interpersonal warmth within an un-met service provider context. It may be noted that another visual feature that communicates interpersonal warmth, a service provider's genuine smile, has been shown to enhance customer satisfaction in actual service encounters (Barger & Grandey, 2006; Grandey et al., 2005). Perhaps, the genuine smile and certain hairstyles are both visual signals of empathy, one of the dimensions of SERVQUAL (Parasuraman, Zeithaml & Berry, 1988).

The present investigation contributes to our understanding of the pre-core service encounter period (Voorhees et al., 2017), building upon earlier studies which found that consumers readily infer service satisfaction from an un-met provider based on rich-content visual evidence (Bebko et al., 2006; Vilnai-Yavetz & Rafaeli, 2011). However, the current work focused on a lean-content visual cue, female hairstyle alone, as a trigger of inferences and stereotypes about the wearer, extending a line of investigation started by psychologists Bereczkei and Mesco (2006) to a services marketing context.

Managerial Implications

Findings from the current investigation have strong implications for how service providers should manage their website. Many providers post photos of themselves and their staff at a provider website, or on LinkedIn or Facebook, and prospective clients may visit these sites. The present investigation demonstrates that consumers infer traits and stereotypes may be activated by the most minimal of visual cues (female hairstyle), and these inferences and activated stereotypes will likely influence provider choice. Indeed, the present study strongly suggests that relationship marketing (Morgan & Hunt, 1994) defined by the authors as "all marketing activities directed toward establishing, developing, and maintaining successful relational exchanges" (p. 22) probably begins in the pre-core period with consumers viewing a personal photograph of the unmet provider at a website.

It is recommended that service providers carefully screen personal photographs of themselves they post at provider websites or elsewhere to be sure the photo is sending the right message. To do this, providers may utilize the services of Photofeeler.com, a website that allows visitors to post a personal business photo and receive feedback from strangers. Photos are scored on three criterions: competency, likability, and influence. Viewers may also include a text note if they want to

comment on your smile or the background or such. Of course, providers could get similar feedback from family and friends, but comments from these sources may be biased. If screening of a business photo finds hairstyle to be unfavorably perceived, this is a relatively easy physical feature to alter.

Related to the above, a reviewer for this paper raised the issue of what to do with a female service employee with a problematic hairstyle. The crux of the issue is the right of personal freedom and self-expression of the employee versus the right of the employer to protect their business interests. In general, courts have upheld the right of employers to impose grooming requirements and other policies to regulate appearance in the workplace as long as the requirements do not discriminate on the basis of race, gender, religion, national origin, age or disability (Perkins, 2014). Yet, it is unclear if there has been a test case involving the right of an employer to meticulously specify how the hair of a female employee should appear (for example, specifying that one or more hairstyles in Figure 1 are appropriate while others are not). The court might conclude the employer is over-reaching.

Limitations

The current investigation has several limitations. First, only female hairstyles of younger women were studied. Inferences from hairstyles more appropriate to middle-age and older women were not explored. Second, images of ethnic hairstyles were not used as stimuli. This limits generalization of the results. Third, samples obtained for all studies (respondents self-selected into the investigation following a recruitment e-mail) were predominately white women. As a result of self-selection bias, other demographic groups are not well represented, as well as groups for which the topic of the studies was not engaging enough to respond. This limits the ability to generalize results to the overall population. Fourth, since hairstyle was the only cue given for respondent inference, the effects of combining hairstyle with other visual information elements (facial configuration, presence or absence of a smile, clothing, and accessories) are unknown. Fifth, stereotypes may vary across different cultures, limiting generalization of the findings of the present investigation to other cultures. For all of the above reasons, generalization of the results is limited.

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SPATIAL AWARENESS: EXAMINING THE IMPACT OF INCOME MOBILITY ON LOCAL ECONOMIC GROWTH UNDER SPATIAL AUTOCORRELATION

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ABSTRACT

This paper examines the role of inequality of opportunity on regional economic growth in the United States. We use data from the commuting zone level to estimate the relationship between intergenerational mobility, as measured by absolute and relative mobility, on per capita income growth from 2000 to 2013. We find that the geographic relationship which exists between observations in the dataset reduces the reliability of estimated coefficients and standard errors obtained using ordinary least squares estimation. We control for spatial autocorrelation caused by this geographic relationship and find that both absolute and relative mobility have a positive effect on growth, adding to the body of evidence which identifies access to opportunity as a critical determinant of economic growth. We also find that absolute and relative mobility both have a 20 percent greater marginal effect on growth than when estimated using ordinary least squares. These findings have important policy implications as they confirm the importance of the inequality of opportunity in local economic development.

Keywords: intergenerational mobility, per capita income growth, spatial econometrics

INTRODUCTION

The relationship between economic growth and inequality has been a central focus of both economic research (Banerjee & Duflo, 2003; Marrero & Rodríguez, 2013; Owen & Weil, 1998). Despite the breadth of this line of literature, there are no definitive findings, with arguments for both direct and indirect casual relationships between inequality and growth. This question has gained even more prominence as economic inequality has increased in both the developed and developing world over the late 20th and early 21st centuries. More recently, while the full economic impact of the global COVID-19 pandemic is still to be determined, it has highlighted the vast differences between groups, both within countries and around the globe. One measure of inequality that has become a larger focus in empirical studies is access to opportunity (Bradbury & Triest, 2016; Marrero & Rodríguez, 2013). This study adds to this body of literature by furthering our understanding of the importance of the access of opportunity as a determinant of economic growth. We accomplish this by estimating the impact that intergenerational income mobility has on per capita income growth in the United States. We help to identify new instrumental variables that help to control for endogeneity. We also seek to understand how the geographic relationship exhibited by observations in the dataset limits the ability to use standard linear regression frameworks.

The relationship between macroeconomic performance and inequality can be misleading, in part because most measures of income inequality often capture multiple effects that may have conflicting impacts on the macroeconomy or fail to capture the differing effects of inequality at various levels of the income distribution. Voitchovsky (2005) finds that the overall Gini

coefficient, the main measurement used to capture income inequality, fails to account for the impact of inequality at different regions of the income distribution. More precisely, the positive association between inequality and growth is driven by inequality at upper portions of the income distribution, while the negative association is driven by inequality at lower levels of the income distribution. Marrero and Rodríguez (2013) argue that typical measures of inequality reflect inequality of opportunity *and* effort. Inequality of opportunity captures circumstances that a person is born into, such as socioeconomic or geographic background, for which they have no responsibility or control over. Inequality of effort on the other hand captures inequality as it relates to individual choice, such as the number of hours worked per week. They find that inequality of opportunity is negatively associated with economic growth, and inequality of effort is positively associated with growth. As such, studies which examine total inequality may find contrasting results depending upon the magnitude of these underlying effects.

Measuring inequality of opportunity is not as direct to capture as measures of overall inequality, like the Gini Coefficient or Theil Index. Marrero and Rodríguez (2013) calculate the inequality of opportunity by measuring "between-group" inequality. For example, groups are created by separating individuals based upon their father's education level or race, and then comparing the inequality between these groups. Another measurement that can capture access to opportunity is intergenerational mobility. Intergenerational mobility is a way of comparing economic outcomes between an individual and that of their parent. These outcomes are typically captured measuring educational levels for parents and children, or by comparing income levels. In many studies, an emphasis is placed on calculating the intergenerational earnings elasticity (IGE), typically found by regressing the log earnings of a parent on log earnings of their child (Solon, 1992). However, work by Chetty, Hendren, Kline and Saez (2014) has moved the focus to mobility measures based upon the parent-child relationship exhibited by their ranks in the income distribution.

To understand how intergenerational mobility relates to the inequality of opportunity, consider an economy in which the level of mobility is relatively low. Lower levels of mobility indicate the level of income persistence is high, suggesting that a person's income is highly dependent upon their parent's income. In this hypothetical economy, it is likely that access to educational institutions and other occupational networks may be dependent upon a parent's education or profession. For example, a high-income parent can afford to live in a neighborhood which has a better school district allowing their child to gain access to better colleges and higher incomes down the line, strictly based upon where they were born. In this economy, a lower level of mobility would correlate to a greater degree of inequality of opportunity. An economy with a relatively high level of mobility would have a lower persistence of earnings. In this economy, access to educational institutions and occupations are thus more likely to be based off individual's ability and talent, and there will be more equitable access to opportunity.

Despite the breakthrough on this view on inequality on growth by Marrero and Rodríguez (2013), studies which have focused on the impact of inequality of opportunity on economic growth have still had inconclusive results. Bradbury and Triest (2016) use measures of mobility that focus on income distribution rank to examine the impact on per capita income growth in the U.S. at local levels. They find measures of intergenerational mobility have varying effects on local development, with absolute measures having a strongly positive impact on growth and relative measures having a weakly positive impact on growth. Mauro (2020) uses similar measures and

finds that absolute mobility has a positive impact on gross metropolitan product in the U.S. from 2000 to 2011. Aiyar and Ebeke (2020) also use intergenerational mobility as a proxy for inequality of opportunity in a cross-country growth regression. They find that omitting mobility from these regressions leads to misspecification, and that lower rates of earnings persistence lead to a greater negative effect of the Gini coefficient on growth. Ferreira, Lakner, Lugo and Özler (2018), however, find a less than conclusive result. Using two different datasets based upon income and expenditure surveys, as well as health and demographic surveys, Ferreira et al. (2018) uses a similar decomposition method to Marrero and Rodríguez (2013) to deconstruct general inequality in order to focus on opportunity. They obtain a negative association between inequality of opportunity and growth; however, this is not a significant result.

Our study contributes to this existing body of research by building on work done by Bradbury and Triest (2016) and examines the role of absolute and relative mobility on per capita income growth at the commuting zone level in the U.S. Commuting Zones are geographic aggregations of counties, not unlike metro areas, that span the entirety of the United States including rural areas (Tolbert & Sizer, 1996). We replicate key findings of Bradbury and Triest (2016) and extend upon their framework by augmenting their initial examination of endogeneity and introduce new instrumental variables for intergenerational mobility. We show that the instruments used here are valid and more effectively control for traditional endogeneity than those previously relied upon by Bradbury and Triest (2016). Our second main contribution is the addition of a spatial regression framework to test the validity of prior results to endogeneity, arising from the underlying geographic relationship exhibited by observations in the data. Correcting for spatial autocorrelation has largely been omitted from standard econometric frameworks, despite its potential impact on key findings. Spatial autocorrelation is similar to serial autocorrelation, with the exception being that persistence occurs across geographic space, rather than across time. In the case of mobility's impact on local economic growth, the existence of spatial autocorrelation is highly likely given the close proximity of observations in the data, and this can lead to inefficient and potentially biased estimators (LeSage & Pace, 2009). Given that previous studies have identified various levels of significance and magnitude with respect to the impact of mobility on growth, we show the necessity to include these controls. We implement a spatial model that accounts for the possible effect of neighboring growth rates and show that the impacts of both absolute and relative mobility are highly significant. Furthermore, we find the effect of both absolute and relative mobility on local per person income growth to be roughly 20 percent greater in magnitude than those obtained in previous studies.

DATA & METHODOLOGY

In this section, we provide an overview of the dataset used in our regression analysis and provide a description of the framework and methods used to estimate the impact of absolute and relative mobility on per capita income growth. The layout of this section will proceed in the following manner. First, we give a detailed explanation of the dataset used for our analysis. Following this, a thorough explanation of the empirical methodology used in the analysis is presented. Here, we discuss the classic linear frameworks used, along with methods used to account for spatial autocorrelation.

Data

To effectively estimate the relationship between intergenerational mobility and economic growth we obtain data from a variety of sources. The geographic area of estimation for our analysis is done at the Commuting Zone level. We adopt the commuting zone level for our analysis, following Bradbury and Triest (2016), as they offer a large array of observations for our analysis at a local level. While it is possible to obtain data at more local levels (e.g., county-level), mobility measures at this lower level of geographic aggregation are prone to be biased due to sorting and high correlation between property prices and parental income (Chetty et al., 2014).

Intergenerational income mobility is measured using two metrics developed by Chetty et al. (2014): absolute mobility and relative mobility. These measures focus on utilizing the rank of both parents and their children in each of their respective income distributions. More precisely, absolute mobility examines the expected rank in the national income distribution of children born to parents at the 25^{th} percentile of the national income distribution. Relative mobility examines the rank-rank correlation of a parent's rank in the income distribution with their child's rank in their income distribution. Unlike absolute mobility, where higher levels indicate greater mobility, high levels of relative mobility reflect a closer correlation of income rank between a parent and their child and indicate lower overall mobility. As such, we rescale relative mobility so that higher levels indicate greater mobility, as is common in the literature (Blanden, Gregg & Macmillan, 2007). Another key difference between these two measures is that absolute mobility focuses entirely on positive outcomes for families at the lower end of the income distribution. Relative mobility however can be determined by a combination of downward mobility from rich families and/or upward mobility of poor families (Chetty et al., 2014). Income mobility is measured using tax data from 2011-2012 for 30-year-old individuals (child generation) and mapped to their parents during their prime working years.

Absolute and relative mobility differ from other mainstream measures of intergenerational mobility, such as the IGE, in that they focus on the rank of the parent and their respective child in the income distribution. Measures focused on income rank have been found to be less susceptible to life-cycle bias compared to elasticity-based measures, particularly those aimed at the lower end of the income distribution like absolute mobility (Chen, Ostrovsky, & Piraino, 2017; Nybom & Stuhler, 2016, 2017). As such, they serve as better measures of inequality of opportunity and in cross-sectional growth regressions when compared against other mainstream measures of intergenerational mobility.

We also utilize several other commuting zone level measures of inequality, such as the Gini Coefficient of parental income, and the ratio of parental income at the 90th and 10^{th} percentile of the income distribution relative to the median. It is necessary to include a variety of measures beyond the Gini coefficient to control for other sources inequality in our growth regressions due to the varying impact of inequality at different levels of the income distribution (Voitchovsky, 2005). All data on income mobility and inequality was obtained from Chetty et al. (2014).

We obtain data on per capita income and population from the Bureau of Economic Analysis (BEA). Economic growth is measured as the growth in per capita income from 2000 through 2013, which coincides with the period during which individuals in the "child" generation of the mobility

measures are active members of the labor force. While Bradbury and Triest (2016) also examines the period from 2007-2013, we omit this subset as there is minimal difference in their key findings. Furthermore, the 2007-2013 period may reflect cyclical changes due to the Great Recession, rather than the longer-term effects of inequality. We also include beginning of the period income per capita in our cross-sectional growth regression to allow for convergence as is typically done in the literature. As we lack access to a panel-data framework, we also include the lagged dependent to account for unmeasured commuting zone-specific factors of growth.

We control for a variety of other local characteristics such as education, age demographics and labor force participation rate that are common in growth regressions. These are gathered from the IPMUS National Historical Geographic Information System (Manson, Schroeder, Van Riper, & Kugler, 2021). Following Bradbury and Triest (2016), we control for commuting zone related exogenous factors related to their respective industry composition by including a variable estimating the pace of employment growth if each industry in the commuting zone grew at its U.S. pace. Finally, we also include measures of religious activity and other lagged demographic variables to serve as instruments. Specifically, we collect data on the number of churches per 1,000 people and the rate of religious adherents per 1,000 people (any denomination) at the county level from the 1980 and 1990 U.S. Religion Census: Religious Congregations & Membership Study conducted by the Association of Statisticians of American Religious Bodies. Lagged demographic variables from 1980 and 1990, such as proportion of foreign-born individuals, workers with a 15 minute or less commute and female headed households with children are also used as instruments following Bradbury and Triest (2016). All county level data obtained by the BEA and IPUMS NHGIS database was aggregated to the commuting zone level. A full list of variables included in our analysis, along with summary statistics, is available in Table 1.

Table 1. Summary Statistics

Variable	Mean	St. Dev.	Min	Max
Absolute Mobility	43.962	5.665	26.672	64.019
Relative Mobility	67.491	6.483	49.237	93.249
Per Capita Income, 2000	62.346	25.822	18.34	292.48
Per Capita Income Growth, 1990-2000	24.322	4.948	12.25	60.74
Per Capita Income Growth, 2000-2013	52.711	10.327	14.02	101.69
Projected Employment Growth, 2001-2013	6.561	5.158	-7.539	55.348
Less than High School Diploma/GED, 2000	0.215	0.076	0.056	0.579
More than High School Diploma/GED, 2000	0.452	0.095	0.196	0.761
Age 15 to 24, 2000	0.153	0.03	0.084	0.34
Age less than 15, 2000	0.225	0.031	0.152	0.404
Age over 54, 2000	0.255	0.05	0.112	0.437
Male Labor Force Participation, 2000	0.678	0.066	0.363	0.841
Female Labor Force Participation, 2000	0.556	0.058	0.298	0.721
Logarithm of Population, 2000	11.676	1.489	8.55	16.62
Gini of Parental Income	0.41	0.079	0.252	0.847
Parent Income Ratio 90th Percentile to 50th Percentile	2.283	0.378	1.599	3.725
Parent Income Ratio 50th Percentile to 10th Percentile	3.276	0.424	2.226	4.729
Churches per 1,000 People, 1980	2.015	0.968	0.295	6.385
Churches per 1,000 People, 1990	2.094	1.014	0.361	6.457
Religious Adherents per 1,000 People, 1980	55.533	16.097	14.468	121.511
Religious Adherents per 1,000 People, 1990	59.298	17.445	13.666	131.96

Proportion Foreign Born, 1980	0.025	0.031	0.002	0.371
Proportion Foreign Born, 1990	0.027	0.038	0.001	0.359
Workers with Commute < 15 Minutes, 1980	0.508	0.141	0.17	0.87
Workers with Commute < 15 Minutes, 1990	0.488	0.139	0.18	0.88
Households with kids headed by single mom, 1980	0.044	0.014	0.011	0.106
Households with kids headed by single mom, 1990	0.056	0.016	0.014	0.132
Observations	708			

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al. (2014).

Empirical Framework

We examine the relationship between our key measures of mobility, serving as a proxy for inequality of opportunity, and economic development by estimating the following empirical relationship:

$$Y = \alpha_0 + \beta X + \gamma \mathrm{Z} + \varepsilon \quad (1)$$

Where Y is the rate of growth in per capita income, X is our measurement of intergenerational income mobility, and Z is matrix of control variables, which include the Gini of parental income, the ratio of parental income at the 90th percentile to the median, the ratio of parental income at the median to the 10th percentile, initial per capita income, lagged per capita income, projected employment growth, the proportion of individuals with less and more than a High School Diploma, the proportion of individuals between the ages of less than 15, 15 to 24, and over 54, male and female labor force participation rates and the logarithm of initial population.

One of the major hurdles concerning the validity of our results is the potential endogeneity of both absolute mobility and relative mobility in our cross-sectional growth regression. To overcome this, we turn to two stage least-squares (2SLS) estimation using two different sets of instruments. The first instrument set used comprises the rate of religious adherence per 1,000 people and the number of churches per 1,000 people in 1980 and 1990, taken from the Association of Religion Data Archives. We draw upon these religiously oriented variables to serves as suitable instruments as Chetty et al. (2014) find that areas that exhibit higher levels of absolute mobility and relative mobility also have higher rates of religious adherence. Mauro (2020) also finds that some measure of religious activity can be effectively used as an instrument for mobility in cross-sectional growth regressions. Further justification for this relationship is that religious activity may serve as an approximation of neighborhood structure and capture the presence of social networks. For example, religious institutions are more likely to play a large role in local communities where there are greater numbers of religious adherents and churches. These institutions offer various ways to aid in childhood development and will arise regardless of an area's income. At a place of worship for example, children may have to do extra studying, they have an opportunity to learn and play musical instruments, participate in plays and so on. Furthermore, many of these congregations exhibit strong social connections amongst its members and provide children with guidance from individuals in addition to their parents. These social connections may help to serve as additional role-models to keep children involved in education, away from crime and help with career paths. This additional involvement can aid low-income family in developing skills that will allow them to climb the income ladder. Although we argue that these instruments affect economic growth solely through their impact on mobility, we provide evidence of their validity and over-

identification restrictions using the Sargan-Hansen's *J*-Test in our analysis. The second instrument used is composed of the 1980 and 1990 proportion foreign-born, proportion commuting less than 15 minutes, and proportion of households with children that have a female household head, following Bradbury and Triest (2016). We include the results from these instruments in our analysis to illustrate the advantage of our first instrument set.

A second potential problem that may arise by estimating the impact of mobility on growth at the commuting zone-level using standard regression frameworks is that any potential spatial effects of the observations on one another are ignored. One attempt to control for this is to estimate the model using regional fixed effects, as is typically done. However, the proximity of the observations in our analysis suggests that nearby commuting zones might have an impact on each other that are not fully captured with the broader regional fixed effects model. This point is reinforced when considering that rates of absolute mobility and relative mobility vary greatly within regions/states. Moreover, these interactions should be considered because of the potential side effects their omission may bring. Specifically, if spatial autocorrelation is ignored than the estimates obtained from standard linear models may be biased and inefficient. Also, if these effects are not controlled for then the R^2 and other goodness-of-fit statistics obtained under OLS may be overestimates (Anselin, 2001).

We control for these spatial interactions by first constructing a weighting matrix which serves to capture the spatial relationship present between observations. The matrix is constructed to give more importance to geographically nearby observations in the data and less importance to further away ones. We denote the spatial weight matrix as W. W is a $N \times N$ matrix that has zeros along its main diagonal, where N is the total number of observations in the dataset. The off-diagonal elements of W, W_{ij}, represent the spatial relationship between elements i and j. The literature points to two common methods of constructing the spatial weight matrix: nearest neighbors and some form of distance-based algorithm. Under the nearest neighbor method, W_{ij} is set equal to 1 if there are no other observations closer to either i or j and set 0 otherwise. This can be done for $k \geq 1$ nearest neighbors. Under a distance-based weighting scheme, W_{ij} is set equal to 1 if the distance between observation i and j is less than some predetermined distance L and 0 otherwise. Using either method, all rows are standardized so that they aggregate to one (Anselin, 1988; LeSage & Pace, 2009). It is important to note that the weighting matrix is taken *a priori* and must be set by the researcher. This implies that all results are conditional upon the design of the weighting matrix (Dubin, 1998). Since all potential results are conditional upon the weighting matrix, we consider multiple weighting schemes to test the sensitivity of the results as the exact spatial relationship exhibited in the data is unknown. First, a *k-nearest-neighbor* weighting structure is adopted, with $k = 3, k = 4$, and $k = 5$ nearest neighbors. Distance-based weighting matrices are also employed, giving weight to commuting zones that are within 50 miles, 100 miles and 150 miles of each other.

In addition to the weighting matrix, the channel through which spatial feedback enters the model must also be accounted for. Generally speaking, two main models are used to control for special dependence: the spatial lag model (SAR) and the spatial error model (SEM) (Anselin, 2001). The SAR model is motivated by the existence of omitted variable bias and places the strength of the spatial interactions on the dependent variable and can be modeled as

$$y = \rho W y + X\beta + \varepsilon \quad (2)$$

where ρ is the spatial autoregressive coefficient, W is the chosen weighting matrix and ε is a vector of error terms. The SAR suffers from endogeneity and simultaneity bias through the error term, which is easily seen in its reduced form equation:

$$y = (I - \rho W)^{-1} X\beta + (I - \rho W)^{-1}\varepsilon. \quad (3)$$

In the context of our analysis, the SAR is akin to modeling the economic growth of a commuting zone based upon independent variables X and the economic growth experienced by surrounding commuting zones depending upon W.

The SEM incorporates spatial dependence not through the dependent variable, but by including an additional regressor in the error structure. Formally the SEM is described as follows

$$y = X\beta + \lambda W\varepsilon + \xi \quad (4)$$

where λ is a spatial parameter, ξ is a spatially uncorrelated error term which satisfies the zero conditional mean assumption, and ε is the spatial component of the error term. The SEM is needed because of a non-spherical error term, where the structure of the spatial dependence is expressed through the off-diagonal elements of the variance-covariance matrix. Under these circumstances, OLS estimators are unbiased but are inefficient and yield inaccurate standard errors.

RESULTS

We begin by presenting the results from our initial estimation obtained from ordinary least squares. Following Anselin (2001), these OLS estimates are meant to serve as a baseline for later comparison with our findings using 2SLS, as well as our spatial results. The results of our OLS estimation can be found in Table 2. In all regressions, regional fixed effects are captured for the nine census divisions, and in models (2) and (4), we also control for various demographic variables.

The estimates for both absolute and relative mobility are strongly significant in all the regression models, indicating that there is a positive relationship between access to opportunity and economic growth. The coefficients for absolute mobility are in the range of 2.86 to 2.92 and are significant at the one percent level. The magnitude of these values indicates that a commuting zone with a level of absolute mobility one standard deviation about the average would have about 16 percent higher growth in per capita income during the sample period. The coefficients for relative mobility are in the range of 0.64 to 0.89 and are also significant at the one percent level. It is important to note that the magnitude of the effect of relative mobility on growth are smaller than those of absolute mobility. For example, a commuting zone with a level of relative mobility one standard deviation above the mean would have grown by about 4.5 percent more during the sample period.

Recall, that relative mobility captures both upward changes in income across generation *and* downward movement. This implies that, with respect to growth, upward movement at the lower levels of the income distribution is more important than relative changes throughout the income distribution. This finding is consistent with those obtained in other studies that examine the impact of mobility and inequality on growth (Bradbury & Triest, 2016; Mauro, 2020; Voitchovsky, 2005).

Turning our focus to the remaining estimated coefficients reveals some expected and some unexpected findings. The estimate for the Gini (overall inequality) is negative and significant across all columns, however, the magnitude varies drastically depending upon the measure of mobility used, as well as the regressors. However, its overall negative effect indicates that commuting zones with higher rates of overall inequality tend to grow at lower levels. Incorporating the findings of Voitchovsky (2005), we next examine the impact of inequality at various levels of the income distribution. The most significant results are found for the ratio of parent's income at the 90th percentile to the 50th percentile, which is found to be positive and significant at the one percent or five percent level. This positive sign may be surprising, given its indication that greater inequality at the top of the income distribution leads to growth, however similar findings are observed by Bradbury and Triest (2016) and are in line with Voitchovsky (2005). The coefficient for the ratio of parental income at the median to the 10th percentile is found to be positive and significant at the one percent level when controlling for absolute mobility, while negative when controlling for relative mobility.

Initial per capita income in 2000 was found to be negative and significant at the one percent level in Models (1) – (3), indicating that commuting zones being with higher levels of per capita income saw less growth during the period in question. This negative coefficient is evidence of, holding all else equal, commuting zone-level income convergence over time. We also find that lagged income growth, as measured by per capita income growth from 1990-2000, is negative and significant at the one percent level when controlling for both absolute mobility and relative mobility. Also, like previous studies, we find that predicted employment growth, based upon commuting zone-level industry composition is strongly associated with growth during the sample period. The demographic controls range with respect to their significance and sign when controlling for either absolute mobility or relative mobility.

Table 2. OLS Regression of Growth on Income Mobility

	Per Capita Income Growth, 2000-2013			
	(1)	(2)	(3)	(4)
Absolute Mobility	2.919***	2.861***		
	(0.191)	(0.199)		
Relative Mobility			0.894***	0.641***
			(0.160)	(0.155)
Gini of Parental Income	-79.018***	-29.179*	-90.004***	-45.793**
	(17.337)	(17.129)	(19.665)	(19.276)
Parent Income Ratio 90th Percentile to 50th Percentile	29.464***	22.056***	17.440***	11.101**
	(3.609)	(3.965)	(3.992)	(4.416)
Parent Income Ratio 50th Percentile to 10th Percentile	2.933	7.191***	-5.144**	-0.282
	(2.105)	(2.234)	(2.304)	(2.469)
Per Capita Income, 2000	-0.624***	-0.701***	-0.557***	-0.243
	(0.175)	(0.252)	(0.197)	(0.283)
Per Capita Income Growth, 1990-2000	-0.417***	-0.360***	-0.500***	-0.437***
	(0.074)	(0.069)	(0.083)	(0.078)
Projected Employment Growth, 2001-2013	0.752***	0.792***	0.856***	1.036***
	(0.163)	(0.163)	(0.186)	(0.183)
Less than High School Diploma/GED, 2000		20.662		75.417***
		(23.199)		(25.915)
More than High School Diploma/GED, 2000		54.988***		76.504***
		(17.847)		(20.508)
Age 15 to 24, 2000		-82.609**		-49.836

		(35.057)		(39.506)
Age less than 15, 2000		140.399***		62.722
		(36.970)		(41.279)
Age over 54, 2000		-10.654		20.296
		(35.439)		(39.952)
Male Labor Force Participation, 2000		3.864		47.234**
		(18.213)		(20.218)
Female Labor Force Participation, 2000		15.799		-36.04
		(29.452)		(33.076)
Logarithm of Population, 2000		-6.237***		-7.757***
		(0.657)		(0.730)
Constant	-81.067***	-88.855**	39.404**	36.492
	(16.364)	(37.247)	(18.309)	(42.276)
Regional Fixed Effects	Yes	Yes	Yes	Yes
Observations	708	708	708	708
R2	0.554	0.63	0.429	0.53

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).
Notes: Standard errors are provided in parentheses. Significance codes: *p< 0.10; **p<0.05; ***p < 0.01.

We control for traditional endogeneity concerns by estimating the effects of absolute mobility and relative mobility on per capita income growth using 2SLS, treating absolute mobility and relative mobility as endogenous. The results of these regressions can be found in Table 3. Models (1) – (2) use religious activity to instrument for mobility, and Models (3) – (4) use lagged demographic variables following Bradbury and Triest (2016). Examining model (1)-(2) in Table 3, we find that absolute mobility is still positive and significant at the one percent level. The coefficient for absolute mobility indicates that, all else equal, a commuting zone with a level of absolute mobility one standard deviation greater than the average would have seen income per capita growth 18 percent higher during the sample period. We find a positive impact for relative mobility; however, the result is no longer statistically significant. In models (3)-(4) we find that both absolute and relative mobility are positive and significant.

The marginally different findings obtained under the two different instrument sets requires further investigation into the overall quality of the instruments. Table 4 provides the results of a series of diagnostic tests regarding the two instrument sets. With respect to the religious activity variables (Instrument Set 1), they have good strength, especially with respect to absolute mobility, with first stage F-statistics greater than 10. Furthermore, the existence of multiple instruments allows us to use Sargan-Hansen's *J*-test of overidentifying restrictions to test the validity of these instruments. For both absolute and relative mobility, we fail to reject the null hypothesis for Sargan-Hansen's *J*-Test, leading us to conclude that Instrument Set 1 is comprised of entirely valid instruments for the two mobility measures used here. When we compare these findings to the instruments used by Bradbury and Triest (2016) (Instrument Set 2), we find that while they report stronger first stage F-statistics, they are not valid as suggested by Sargan-Hansen's *J*. Considering the results of the first-stage F-statistic and Sargan-Hansen's *J*-Test, we find strong empirical evidence that our religious activity instruments are superior to Instrument Set 2, and their findings should be weighted more heavily. Building upon this point, we also conduct the Wu-Hausman Test for endogeneity to assess the consistency of the 2SLS estimators compared to those obtained using OLS. The large p-values obtained when conducting this test using Instrument Set 1 suggests that the OLS and 2SLS estimators are not inconsistent and given the superior efficiency of OLS lends evidence in support of the estimates obtained in models (2) and (4) from Table 2.

Table 3. Two-Stage Least Squares Regressions of Growth on Income Mobility

	Per Capita Income Growth, 2000-2013			
	(1)	(2)	(3)	(4)
Absolute Mobility	3.226***		1.997***	
	(0.491)		(0.368)	
Relative Mobility		1.094		0.679**
		(0.828)		(0.269)
Gini of Parental Income	-27.369	-47.504**	-33.464*	-45.936**
	(17.314)	(19.638)	(17.429)	(19.294)
Parent Income Ratio 90th Percentile to 50th Percentile	23.957***	13.878**	17.558***	11.333**
	(4.609)	(6.684)	(4.327)	(4.618)
Parent Income Ratio 50th Percentile to 10th Percentile	8.472***	1.526	4.159*	-0.131
	(2.736)	(4.091)	(2.508)	(2.621)
Per Capita Income, 2000	-0.754***	-0.216	-0.574**	-0.241
	(0.261)	(0.289)	(0.260)	(0.283)
Per Capita Income Growth, 1990-2000	-0.355***	-0.459***	-0.374***	-0.439***
	(0.069)	(0.088)	(0.070)	(0.078)
Projected Employment Growth, 2001-2013	0.750***	0.975***	0.892***	1.031***
	(0.171)	(0.214)	(0.169)	(0.185)
Constant	-113.206**	-9.688	-31.207	32.64
	(47.834)	(93.298)	(42.974)	(47.880)
Regional Fixed Effects	Yes	Yes	Yes	Yes
2000 Demographics	Yes	Yes	Yes	Yes
Observations	708	708	708	708
R2	0.628	0.524	0.620	0.530

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).

Notes: Models (1) and (2) treat absolute and relative mobility as endogenous with instruments for both measures being the number of churches per 1,000 people and the total rate of religious adherent per 1,000 people in 1980 and 1990. Instruments for Models (3) and (4) are the proportion of foreign-born, proportion commuting less than fifteen minutes, and proportion of households with children that have female head and no spouse parent in 1980 and 1990 taken from Bradbury & Triest (2016). Standard errors are provided in parentheses. Significance codes: *p< 0.10; **p<0.05; ***p< 0.01.

Table 4. Two-Stage Least Squares Diagnostic Tests

		Instrument Set 1		Instrument Set 2	
Mobility Measure	Test	Statistic	P-Value	Statistic	P-value
Absolute Mobility	1st Stage F-stat	33.836	0.000	48.791	0.000
	Wu-Hausman	0.666	0.415	8.189	0.004
	Sargan-Hansen's *J*	2.473	0.480	40.378	0.000
Relative Mobility	1st Stage F-stat	12.565	0.000	56.154	0.000
	Wu-Hausman	0.313	0.576	0.029	0.864
	Sargan-Hansen's *J*	1.771	0.183	50.742	0.000

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).

Notes: Instrument Set 1 is comprised of the number of churches per 1,000 people and the total rate of religious adherent per 1,000 people in 1980 and 1990. Instrument Set 2 are the proportion of foreign-born, proportion commuting less than fifteen minutes, and proportion of households with children that have female head and no spouse parent in 1980 and 1990 taken from Bradbury & Triest (2016).

Spatial Results

Given the findings from Table 3 and Table 4, endogeneity in the traditional sense does not appear to be a significant problem. This provides strong evidence of the positive effect of intergenerational mobility, especially absolute measures, on per capita income growth during the sample period. However, given the close geographic proximity of the observations to each other, the OLS model may suffer from endogeneity arising from the underlying spatial relationship. Here, our analysis further extends upon the previous work done by Bradbury and Triest (2016) and Mauro (2020) by examining this possibility. Table 5 presents the results of Moran's *I* Test for spatial autocorrelation in the OLS residuals when controlling for regional fixed effects, 2000 demographic variables and either absolute mobility or relative mobility (i.e., models (2) and (4) from Table 2). We strongly reject the null hypothesis across all weighting matrices used, suggesting that the OLS models suffer from spatial autocorrelation. Depending upon the underlying spatial structure, the estimators obtained under OLS may be inefficient and/or biased (Bivand, Pebesma & Gómex-Rubio, 2013; LeSage & Pace, 2009).

Table 5. Moran's *I* Test for Spatial Autocorrelation in OLS Residuals.

Mobility Measure = Absolute Mobility			
Weighting Matrix	Moran's *I*	E(I)	P-Value
k = 3 Nearest Neighbors	0.306	-0.019	0.000
k = 4 Nearest Neighbors	0.247	-0.018	0.000
k = 5 Nearest Neighbors	0.242	-0.018	0.000
k = 50 miles	0.361	-0.019	0.000
k = 100 miles	0.241	-0.018	0.000
k = 150 miles	0.180	-0.016	0.000
Mobility Measure = Relative Mobility			
Weighting Matrix	Moran's I	E(I)	P-Value
k = 3 Nearest Neighbors	0.416	-0.015	0.000
k = 4 Nearest Neighbors	0.374	-0.015	0.000
k = 5 Nearest Neighbors	0.373	-0.014	0.000
k = 50 miles	0.453	-0.015	0.000
k = 100 miles	0.341	-0.014	0.000
k = 150 miles	0.278	-0.013	0.000

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).

We begin investigating the underlying spatial structure using LaGrange multiplier (LM) tests to identify whether the SAR or SEM best explains the spatial relationship of the data (Anselin et al., 1996). These tests examine whether the spatial parameters ρ or λ in either Equation (2) or (4) are statistically different from zero. The results of these tests are presented in Table 6. When using the standard LM tests for either the SER or SAR, we reject the null hypothesis that the spatial parameters are equal to zero. In this instance, we rely on the results from the robust versions of these tests, where we find strong evidence in favor of the SAR, which carries the implication that the OLS estimators are biased. Practically, there is also theoretical justification that the growth of smaller geographic areas would be dependent upon the growth of their close surrounding neighbors.

Table 6. LaGrange Multiplier Tests for Spatial Dependence

Mobility Measure = Absolute Mobility								
Weighting Matrix	LMerr		LMlag		RLMerr		RLMlag	
	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value
k = 3 Nearest Neighbors	123.041	0	177.489	0	0.294	0.59	54.741	0.00
k = 4 Nearest Neighbors	120.650	0	164.454	0	0.190	0.66	43.994	0.00
k = 5 Nearest Neighbors	151.698	0	203.586	0	0.788	0.37	52.676	0.00
k = 50 miles	107.735	0	130.668	0	0.820	0.37	23.753	0.00
k = 100 miles	141.479	0	185.159	0	1.551	0.21	45.231	0.00
k = 150 miles	203.063	0	217.289	0	24.502	0.00	38.727	0.00
Mobility Measure = Relative Mobility								
Weighting Matrix	LMerr		LMlag		RLMerr		RLMlag	
	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value	Statistic	P-Value
k = 3 Nearest Neighbors	203.880	0	256.804	0	1.138	0.29	54.062	0.00
k = 4 Nearest Neighbors	214.533	0	257.465	0	0.042	0.84	42.975	0.00
k = 5 Nearest Neighbors	264.068	0	311.876	0	0.764	0.38	48.572	0.00
k = 50 miles	144.417	0	181.244	0	1.299	0.25	38.125	0.00
k = 100 miles	222.209	0	267.242	0	0.742	0.39	45.774	0.00
k = 150 miles	305.447	0	321.534	0	22.826	0.00	38.914	0.00

Source: Author's calculations.

Notes: The above tests are the LM test for error dependence (LMerr), the LM test for a missing spatially lagged dependent variable (LMlag), the robust LM error (RLMerr), and the robust LM lag (RLMlag).

We account for the presence of a spatially lagged dependent variable and estimate an SAR for all weighting matrices. The results of these regressions, when mobility is measured using absolute mobility, are provided in Table 7. The estimated coefficient for ρ, the spatial component, is positive and significant at the one percent level across all spatial weighting matrices. This indicates that the growth rates of nearby commuting zones during the sample period have a positive effect on the growth rate of any commuting zone. We also find that the coefficient governing absolute mobility is positive and significant at the one percent level, highlighting the importance of absolute mobility in determining local economic growth. Comparing the results obtained in Table 7 to those obtained in Table 2, there is little change with the exception that the Gini coefficient is no longer statistically significant at any level. Table 8 presents the estimated SAR when controlling for intergenerational mobility using relative mobility. Again, we obtain a positive and significant spatial lagged dependent term. We also find that relative mobility is positive and is at least significant at the five percent level for all weighting matrices. We also find that when using relative mobility, the Gini is again negative, but weakly significant at the 10 percent level. Initial per capita income in 2000 is no longer significant. All models from Table 7-8 were retested for any residual spatial autocorrelation, and none was found.

Interpretation of the coefficients reported in Table 7-8 should be done cautiously. Accurate measurement for the marginal effects of key variables on growth must take into account, not only the direct effects that mobility has on growth, but additionally any potential feedback, or indirect effects, that may arise from the spatial relationship exhibited by the SAR (Bivand & Piras, 2015). This can more clearly be seen in Equation (3). We present these marginal effects for both absolute mobility and relative mobility in Table 9. The marginal effect of absolute mobility on per capita income growth is in the range of three to four percent, which is roughly 20 percent greater than the 2.86 percent impact obtained under OLS. This suggests that a commuting zone with a level of absolute mobility one standard deviation above the mean would experience about 19.5 percent per

capita income growth during the sample period versus 16 percent as previously thought. The marginal effect of relative mobility on per capita income growth is in the range of 0.6 to one percent depending upon the weighting matrix used. This is on average about 20 percent higher than the 0.9 percent impact when spatial effects are ignored. In this case, a commuting zone with a level of relative mobility one standard deviation above the mean would experience five percent growth in per capita income over the sample period. Taking Tables 7 through 9 into account, the spatial relationship exhibited between commuting zones can have a large impact on the role of intergenerational mobility on local economic development.

This analysis leads to two key observations. First, absolute measures of income mobility that focus on the lower portion of the income distribution have a larger impact on per capita income growth than relative measures like relative mobility. Relative mobility however still has a positive and significant impact. Second, failure to consider the underlying spatial structure of the data can lead to a significant underestimation of the effects of both absolute *and* relative mobility on regional economic growth.

Table 7. Spatial Lag Model Results when controlling for Absolute Mobility.

	Per Capita Income Growth, 2000-2013					
	(1)	(2)	(3)	(4)	(5)	(6)
Absolute Mobility	1.908***	1.956***	1.931***	2.134***	2.032***	2.168***
	(0.186)	(0.191)	(0.191)	(0.188)	(0.190)	(0.196)
Gini of Parental Income	-19.151	-20.755	-22.718	-25.195	-20.838	-21.011
	(14.952)	(15.295)	(15.260)	(15.332)	(15.285)	(15.707)
Parent Income Ratio 90th Percentile to 50th Percentile	15.656***	16.144***	16.527***	18.215***	18.028***	18.926***
	(3.480)	(3.558)	(3.546)	(3.559)	(3.553)	(3.645)
Parent Income Ratio 50th Percentile to 10th Percentile	4.349**	4.504**	4.450**	5.131**	4.973**	5.053**
	(1.959)	(2.004)	(1.997)	(2.004)	(2.000)	(2.054)
Per Capita Income, 2000	-0.501**	-0.548**	-0.508**	-0.527**	-0.606***	-0.633***
	(0.221)	(0.226)	(0.225)	(0.226)	(0.225)	(0.231)
Per Capita Income Growth, 1990-2000	-0.284***	-0.273***	-0.281***	-0.298***	-0.283***	-0.313***
	(0.060)	(0.062)	(0.062)	(0.062)	(0.062)	(0.063)
Projected Employment Growth, 2001-2013	0.607***	0.610***	0.618***	0.622***	0.593***	0.654***
	(0.143)	(0.147)	(0.146)	(0.147)	(0.147)	(0.150)
Constant	-35.186	-41.376	-38.426	-51.696	-38.256	-41.828
	(32.667)	(33.394)	(33.300)	(33.434)	(33.375)	(34.390)
ρ	0.410***	0.410***	0.410***	0.410***	0.410***	0.410***
	(0.035)	(0.037)	(0.039)	(0.029)	(0.038)	(0.048)
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
2000 Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	708	708	708	708	708	708
Log Likelihood	-2,887.88	-2,901.01	-2,898.31	-2,902.60	-2,899.79	-2,912.50
Akaike Inf. Crit.	5,827.76	5,854.02	5,848.63	5,857.20	5,851.59	5,877.01

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).
Notes: Standard errors are provided in parentheses. Columns 1 – 3 use k=3, 4, & 5 nearest neighbors weighting matrices and Columns 4 – 6 use k=50-, 100-, & 150-mile distance weighting matrices. Significance codes: *p< 0.10; **p<0.05; ***p< 0.01.

Table 8. Spatial Lag Model Results when controlling for Relative Mobility.

	Per Capita Income Growth, 2000-2013					
	(1)	(2)	(3)	(4)	(5)	(6)
Relative Mobility	0.302**	0.313**	0.321**	0.419***	0.364***	0.433***
	(0.127)	(0.130)	(0.129)	(0.132)	(0.131)	(0.135)
Gini of Parental Income	-26.117*	-27.945*	-30.419*	-35.280**	-29.009*	-29.728*
	(15.699)	(16.048)	(16.002)	(16.316)	(16.160)	(16.746)
Parent Income Ratio 90th Percentile to 50th Percentile	7.220**	7.540**	8.251**	9.661***	9.763***	10.446***
	(3.598)	(3.677)	(3.666)	(3.738)	(3.702)	(3.834)
Parent Income Ratio 50th Percentile to 10th Percentile	-1.015	-0.967	-0.897	-0.548	-0.518	-0.733
	(2.011)	(2.055)	(2.049)	(2.090)	(2.069)	(2.144)
Per Capita Income, 2000	-0.189	-0.237	-0.19	-0.171	-0.294	-0.3
	(0.230)	(0.235)	(0.235)	(0.239)	(0.237)	(0.245)
Per Capita Income Growth, 1990-2000	-0.307***	-0.291***	-0.301***	-0.332***	-0.310***	-0.350***
	(0.064)	(0.066)	(0.066)	(0.066)	(0.066)	(0.069)
Projected Employment Growth, 2001-2013	0.714***	0.711***	0.719***	0.743***	0.701***	0.777***
	(0.150)	(0.153)	(0.153)	(0.156)	(0.155)	(0.160)
Constant	58.860*	53.446	54.407	44.802	58.851*	58.891
	(34.439)	(35.209)	(35.128)	(35.798)	(35.434)	(36.713)
ρ	0.511***	0.535***	0.561***	0.387***	0.569***	0.606***
	(0.032)	(0.034)	(0.035)	(0.028)	(0.035)	(0.042)
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
2000 Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Observations	708	708	708	708	708	708
Log Likelihood	-2,934.21	-2,946.88	-2,942.89	-2,957.25	-2,949.81	-2,965.41
Akaike Inf. Crit.	5,920.41	5,945.76	5,937.79	5,966.51	5,951.62	5,982.83

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).
Notes: Standard errors are provided in parentheses. Columns 1 – 3 use k=3, 4, & 5 nearest neighbors weighting matrices and Columns 4 – 6 use k=50-, 100-, & 150-mile distance weighting matrices. Significance codes: *p< 0.10; **p<0.05; ***p< 0.01.

Table 9. Impacts of Absolute and Relative Mobility from Spatial Lag Model Estimation

Mobility Measure = Absolute Mobility			
Weighting Matrix	Direct	Indirect	Total
k = 3 Nearest Neighbors	2.011	1.223	3.234
k = 4 Nearest Neighbors	2.045	1.305	3.349
k = 5 Nearest Neighbors	2.045	1.305	3.349
k = 50 miles	2.226	0.841	3.066
k = 100 miles	2.122	1.573	3.694
k = 150 miles	2.221	1.796	4.017
Mobility Measure = Relative Mobility			
Weighting Matrix	Direct	Indirect	Total
k = 3 Nearest Neighbors	0.329	0.288	0.617
k = 4 Nearest Neighbors	0.339	0.334	0.674
k = 5 Nearest Neighbors	0.346	0.384	0.730
k = 50 miles	0.450	0.234	0.684
k = 100 miles	0.393	0.451	0.844
k = 150 miles	0.454	0.643	1.098

Source: Author's calculations based upon data from the U.S. BEA, Manson et al. (2021), and Chetty et al., 2014).

DISCUSSION & CONCLUDING REMARKS

This study has presented further evidence of the impact of the inequality of opportunity on local economic growth. We use data on intergenerational mobility and other measures of inequality obtained from Chetty et al. (2014), along with data from a variety of other sources, to show the positive effect that access to opportunity, as measured by intergenerational mobility, has on per capita income growth at the commuting zone level in the US from 2000 to 2013. This relationship was shown to be robust to traditional endogeneity when the number of churches per 1,000 people and the rate of religious adherents per 1,000 people from 1980 and 1990 are used as instruments for either absolute mobility or relative mobility. The addition of these valid instruments to the literature is a major contribution of this study. Due to concerns over endogeneity, valid instruments are needed to accurately estimate the relationship between mobility and economic growth. We show that instrumental variables used in previous studies are invalid and fail to control for endogeneity, calling into question the findings of these earlier studies.

A second major contribution of this study is the inclusion of an econometric framework that controls for the underlying geographic relationship. The close proximity of the observations means that economic growth rates of nearby commuting zones are dependent on one another. The failure to account for this feedback, which standard linear regression frameworks do, means that any statistical conclusions obtained from cross-sectional growth studies may be invalid. We use the SAR model to control for the spatial relationship of nearby economic growth rates and find that the impact of absolute mobility and relative mobility on per capita income growth are *greater* than estimates obtained using OLS and 2SLS. Furthermore, both measures of mobility were found to be significant at the 1 percent level.

These findings are largely in line with those obtained by Bradbury and Triest (2016) and Mauro (2020) and suggest that absolute mobility and relative mobility may be of greater importance for local economic development. Another key consistency in the results obtained here and previous works is the relatively greater importance of absolute mobility over relative mobility. When controlling for spatial autocorrelation, the impact of absolute mobility on per capita growth from 2000 to 2013 is five to six time greater than relative mobility, depending upon the spatial weighting matrix used. One potential reason for this can be attributed to the construction of these variables. absolute mobility focuses strictly on the upward movement of children born to the parents at the 25^{th} percentile of the national income distribution. Relative mobility, however, captures upward and downward movement from one generation to another. As pointed out by Voitchovsky (2005), the effects of inequality on growth are more likely to be positive at the bottom tiers of the income distribution. The greater magnitude of absolute mobility may reflect this result. Another possible explanation can be found by drawing upon Marrero and Rodríguez (2013), who point out that equality of opportunity has a positive impact on growth. As such, it could be that absolute mobility does a better job than relative mobility at capturing access to opportunity. Since absolute mobility is focusing solely upon the economic outcomes of a specific subset of parents, more is held equal across commuting zones. Areas with higher levels of absolute mobility signifies that children in those areas obtain greater incomes, perhaps due to greater access to educational institutions or employment opportunities. Relative mobility may not capture these relationships as well because it looks at changes throughout income distribution. These changes can be attributed to several

reasons, some of which may relate more strongly to the equality of effort and lead to a smaller impact on growth.

These results can have important implications for public policy. Policies aimed at reducing the inequality of opportunity can have a greater impact on regional per capita income growth than previously believed. It is also more apparent that policies which are targeted at the lower half of the income distribution may affect local economic growth at a higher magnitude than those focused on relative measures throughout the income distribution. Beyond this, there are numerous areas that require further study to enact effective policy. Access to opportunity, as measured by intergenerational mobility, is an important determinant of local economic development, however what are the determinants of opportunity and mobility? Studies such as Chetty et al. (2014) and Blankenau and Youderian (2015) highlight the importance of early education expenditures and the quality of schooling as potential determinants of intergenerational mobilty. Measures of school quality can vary from spending to instructor effeciency to peer effects and future work to indentify the which of measurement is dominant. Fershtman, Murphy and Weiss (1996) focuses on the importance of social status in invidual occupation choice. The importance of status is often not accounted for in large sections of the economic literature and most certainly impacts occupation and schooling decisions for one's self and their children which could further impact intergenerational mobility.

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