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Market Density as an Indicator for Food Insecurities

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Pro victimis esurient et bellum

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ABSTRACT

Food security is outlined as the universal capacity to procure safe food goods in a diurnal modus consistent with biological load and lifestyle. Therefore, food insecurity is the failure of these processes, which can predictably lead to anthropometric deviations, reduced educational attainment, and other deleterious public health disruptions. It is thereby crucial to reveal novel approaches in predicting food insecurities, and to elucidate if subsisting mechanisms either frustrate or fortify these conditions. Colombia is a developing country suffering from an internal conflict that has displaced over 5.2 million residents. This humanitarian crisis characteristically exacerbates established food insecurities, which extends over 41% of the total population, or 19.2 million inhabitants. Hencetofore, no study has attempted to couple market distribution to the reported food security status of Bogotá D.C., a megalopolis of 8.7 million residents, of which, more than 5.8 million remain currently food insecure. It was then hypothesized that market density could reliably infer sustenance anxieties athwart the 20 localities of Bogotá. Our results revealed an orthogonal relationship between market distribution and varying levels of food insecurities throughout Bogotá, foisting poverty as a primary antecedent to hunger.

CHAPTER ONE

INTRODUCTION

As the escalation of the global populace intensifies, the biosphere is anticipated to reach its latent carrying capacity (Sachs, 2008) and accordingly, the requisite procurement of food goods will become linearly disproportional to realtime food consumption. Present estimates forecast this capacity to be 9-10 billion persons (Wilson, 2012), with current global metrics reaching 7.2 billion persons in 2014 (United States Census Bureau [USCB], 2014). Therefore, it is imperative to consider and anticipate future water and nutrient asymmetries before they become globally established, to offer a tersely buoyant postulate to the ailing distortions of the very framework of humanity. For unresolved, these conditions could outpace the boundaries that have exclusively buffered the food secure from the stark realities historically burdened by the impoverished.

Colombia is a developing country found upon the northwest apex of South America (United States Central Intelligence Agency [CIA], 2014). Currently, Colombia serves as a valid model to monitor food security secondary to the distinctive conditions inherent to human translocation due to an ongoing civil war, or internal conflict (Internal Displacement Monitoring Centre [IDMC], 2013). Despite a robust economy and a favorable finance classification by the World Bank (2013), volatile public safety concerns are often further exacerbated by the pestilence of narcoterrorism and pervasive violence (Holmes, Gutiérrez de Piñeres, & Curtin, 2008), which still distresses the nation. These contradictory affirmations still ensures that Colombia can remain an ideal locus for both international commerce and foreign investments with limited risk (World Bank, 2013), with contemporary metrics suggesting the strongest within Latin America (Proexport, 2013).

The World Bank defines food security as the unriveted universal access to appropriate nutrition for an active healthy lifestyle (World Bank, 1986), which leans further into the alimentary characteristics of apposite nourishment in regard for basic human requirements. In children, food insecurities commonly regulate downstream anthropometric disruptions (Black, Allen, & Bhutta, 2008) that can characteristically indicate low educational attainment (Martin & Marsh, 2009). These features reinforce the contention that poverty and social capital remediation can provide shareholder communities (Blum, 1982; Pogge, 2008) both the reach and realization to reasonably implement sound theories and realistically self-program future interventions (Bhutta et al., 2008).

Community-level food obstacles such as inaccess or limited access to supermarkets have been previously identified to contribute to food desertesque conditions (Blanchard & Matthews, 2007). Historically, these foreboding antecedents portend communities with nutrient attainment and food security concerns (Powell, Auld, Chaloupka, O'Malley, & Johnston, 2007). Nonetheless, these precursors befall as inert obstructions that are anticipated to favorably contribute to investor's incentives by providing cost-conscious solutions to perceived market risks, as socioeconomic interfaces within slum communities are not traditionally ideal for large retail distribution nor commercial investments.

Synergistically, these conditions are anticipated to aggravate and magnify food insecurity, and consequently, the public health of a given population. It is therefore compulsory to distinguish potential indicators of social variance encompassing humanitarian crises, for even the constituents of the modern and developed world may inevitably succumb to the momentous footmark of food insecurity, and suffer too, the hand-to-mouth burden of the impoverished.

PURPOSE

The purpose of this thesis was to determine if market density could pose as a potential indicator for food securities among urban sectors of Bogotá, Colombia. Particularly, it should reveal whether supermarket allocation given a spatial function was a dependable marker of alimentary indices among those living in the slums and their counterpart compatriots throughout other localities of Bogotá. By comparing the prevailing disparities of sustenance access in these sectors, this thesis was positioned to answer if passive applications of capitalist mechanisms may ensnare and contract food securities for the urban poor of Bogotá, Colombia.

SIGNIFICANCE

The significance of these findings shall bare if retailer distribution can reflexively function as a passive socioeconomic barrier to those who are most at risk of hunger and those suffering from established food insecurities in Bogotá, Colombia.

STATEMENT OF PROBLEM

Colombia's prolonged civil war has encouraged and shaped one of the world's worst humanitarian crises, as millions of inhabitants have become forcibly displaced leading to grave food insecurities of those affected (IDMC, 2013). As the majority of persons displaced translocate to urban regions such as Bogotá to escape the rural violence (Ibáñez, 2008), the juxtaposition of communal disarray aggravates the already strained population dynamic compounding existing sustenance anxieties among other public health concerns. For if limited access of food goods exists in slum communities through the absence of retailers, it is imperative to demonstrate what influence inaccess has upon either the recovery or exacerbation of food insecurities.

HYPOTHESIS

Market density reveals no correlation in the inequities of sustenance availabilities measured by household food security statuses of those who reside in Ciudad Bolívar and those from other localities of Bogotá. It is anticipated that important diurnal disparities in caloric fitness and the cognate incompetence to procure nutritious foods sustainably in Ciudad Bolívar exist similarly to other beset urbanized sectors of Colombia, and that such failures are not isolated to the urbanized slums.

LIMITATIONS

Quantitatively, meta-analysis and correlation studies can be extrinsically flawed secondary to the ingression of contaminated data and other avertible and unpredictable variables such as conditional partiality, institutional bias, or political prejudice.

DELIMITATIONS

To approach any hidden limitations within the data itself, outliers shall be statistically challenged by descriptive statistics, a measure that produces various indications to whether the aforementioned treatments can reliably infer and stand against a series of downstream interrogatories.

ASSUMPTIONS

When assuming a system to which conduct can be examined in relation of preclusion by disturbing altruistic castigations and analogous incentives (Fehr & Gachter, 2002) to particular consumer behaviors, one can operably anticipate that influence reflects the following postulate: when incentive for desired effects (or *behavior*) are matched accordingly to the utilitarian role, sustained effort will be favored when $b > 0$ (Banerjee & Duflo, 2011). This is compulsory to consider as markets are governed by a series of economic principles and modern theories

involving such incentives, flux, and both intrinsic and extrinsic behaviors (human & institutional).

DEFINITIONS

Brain drain is the sociologically-based description of the emigration phenomenon of highly skilled, talented, or educated human capital (Sachs, 2005).

Departments are characteristically recognized as an analogue to the nationalized U.S. state system (Bergquist, Peñaranda, & Sánchez, 2001).

Dollars or *USD*, are presumed U.S. dollars unless otherwise noted.

Economic growth is the long-run progression of economic expansion that results from a compounding of economic events throughout time (Sharp, Register, & Grimes, 2010).

Food security is the reliable capacity to procure sufficient foods to sustain an active, healthy lifestyle (World Bank, 1986).

Human capital is defined as the productive influence of human or labor resources resultant from investment in education and training (Sharp, Register, & Grimes, 2010).

Internally displaced person (IDP) is a person who has not crossed internally-recognized borders, yet has been forced or obliged to escape habitation as a reaction to war, internal conflict, human or natural-made disasters, otherwise generalized violence or human rights abuses (IDMC, 2013).

Latin America is considered all western hemispheric countries south of the United States (American Heritage Dictionary, 1994).

Logistic modulus is introduced by the author as the magnification and expansion of poverty traps by maintaining or encouraging biological stress whilst increasing the physiological demand for caloric investment.

Market density is defined by the number of customers within a generalized land unit, traditionally km^2 or mi^2 (Black's Law Dictionary, 2014). Henceforth, the definition of

market density (P_m) has been expanded for the purposes of this research, as the relationship of supermarket distribution within finite boundary conditions relative to the spatial relationship to consumers within a given locality; therefore, market distribution is classically defined as the number of markets per locality $N_m \lambda^{-1}$, respectively.

Occupation proximity effect is introduced by the author as the linear consequence (or ancillary yield) of vocational arrangements (i.e. a farmer has an enhanced occupation proximity effect vis-à-vis food fare secondary to the production, harvesting, & distribution of farmed goods).

Social development is defined as a group's competence to direct and control its physical and intellectual environment to reach their objectives (Morris, 2010).

CHAPTER TWO

REVIEW OF LITERATURE

Since the inception of man, food security has sustained an all-pervading role in the bygone interface of individual, community, and genus survival. By understanding the precursors to food insecurity and improving methodologies to monitor, maintain, and prevent the varying degrees of antecedents, the hope is to add value to the bastion of scientific literature by synergizing food security studies to socioeconomic barriers that encumber the capacity to gather food. Further, though many economic analyses have revealed market trends and correlations to different consumer behaviors, to the researcher's knowledge, no study has coalesced both aspects of marketplace distribution to the reported food securities in Bogotá, Colombia – a principal nucleus for one of the largest internalized refugee communities in the world (IDMC, 2013).

COLOMBIA

The Republic of Colombia is a South American nation within the World Geodetic System 1984 (WGS 84) geodesy, sustaining geospatial coordinates (4 00 N, 72 00 W) that borders two oceans (Atlantic Ocean / Caribbean Sea and North Pacific Ocean) and five countries (clockwise) Venezuela, Brazil, Peru, Ecuador, and Panama (CIA, 2014). Geospatially, the projection coordination system utilized in Colombia is the Gauss Conform Transverse Mercator, a defined truncation of Gauss Schreiber, a projection precursor for the North American Datum of 1927 (NAD27), particular of the United States. Previously, Colombia championed conjectural geospatial projections derived from the Provisional South American Datum 1956 (PSAD56), South American Datum 1969 (SAD69), and Bogotá Datum 1941 (Magnier, 1997), all of which remain contemporaneously abandoned geodesies

by Colombia – nonetheless theoretically conserved athwart Colombia and pragmatically applied by regional counterparts.

Historically, early Colombia which was inhabited by various indigenous tribes, most notably the Muisca tribes (Castillo-Mathieu, 1992) and then subsequently subjugated by Spain by 1499. Spain employed Christopher Columbus, a slapdash Italian seafarer whose failed attempts in negotiating terms with King João II of Portugal (Bergreen, 2011), led him to Spain for his expeditionary funding. Accordingly, even King Ferdinand II of Aragon was disinclined if not averse to the exploration, possessing little to no confidence in Columbus. Nevertheless, after careful consultation with the courts' doyens, Queen Isabella of Castile reluctantly commissioned Columbus for the journey in 1492 (Bergreen, 2011). Not copiously confident in the maritime competency or expertise of Columbus himself, Queen Isabella had little hope for the voyage's success or even an expectation for the survival of Christopher Columbus and his men (Bergreen, 2011). It should be noted that Queen Isabella of Castile and King Ferdinand II of Aragon are wed and ruled jointly throughout Spain in a power-shared arrangement.

The New World was realized (or [re] discovered) by Christopher Columbus once the Santa María, Pinta, and la Niña beached the shores of Watlings Island (modern day San Salvador of the Bahamas islands) and Hispaniola in 1492, or modern-day Haiti & Dominican Republic (Bergreen, 2011). From there, a reign of terror renowned as the Inquisition, whose ranges spanned enslavement, immolations, mass mutilations and genocide (De las Casas, 1971) swept throughout the The New World. After a period of rule (1492-1500), Columbus was recalled back (and temporarily jailed) in Spain until his release by King Ferdinand; consequently, Hispaniola was governed by Bobadilla (Bergreen, 2011). During this period (1494-1508) both

anthropologists and historians estimate that over 3 million indigents were killed or disappeared (De las Casas, 1971) from the New World.

Colombia liberated itself from Spain during a revolution spearheaded by Simon Bolívar on July 20, 1810 and was officially recognized nine years later on August 7, 1819 (Holmes et al., 2008). Following independence, the initial outcome of the liberation was the formation of Gran Colombia (1819-1831), and its respective national land allocation encompassed present-day Colombia, Ecuador, Panama, northern Peru, Venezuela, northwest Brazil, and western Guyana (Holmes et al., 2008).

Following the succession of Ecuador and Venezuela, Gran Colombia transitioned to the Republic of New Granada, and in 1863, New Granada evolved into the United States of Colombia, and in 1886 adapted the current moniker, Republic of Colombia. Panama is the most recent of countries to call for their own independence (U.S. influence withstanding) from Colombia in (Holmes et al., 2008). Disjointedly, Ecuador, Peru, and Venezuela achieved their own sovereignty and independence from Colombia (Holmes et al., 2008).

Currently, Colombia is the second largest country in South America by population with an estimated 47.2 million citizens among the surface area of 1,138,910 square kilometers, allocating 100,210 square kilometers specifically to maritime, and 1,038,700 square kilometers of terrestrial space (CIA, 2013). The total area of Colombia currently ranks 26th in the world, with a distinctive geographical locus that comprises 3,208 km of coastline and 6,309 km of terrestrial boundaries (CIA, 2014). Colombia currently ranks 23rd in world population, with a 2013 population density of 41 inhabitants / km^2 and is the third largest Spanish speaking population in the world, independent of Spain and Mexico (Proexport, 2013).

Bogotá D.C., is the largest city and capital district of Colombia, which is located at the foot of Monserrat and Guadelupe and along the Altiplano Cundiboyacense plateau in the Andes Mountains, with an altitude of 2,640 meters / 8,660 feet. Previously celebrated in the chibcha language as Bacatá, named by the indigenous Muiscas as a reference to "planted fields". Bacatá was later changed Santa Fé de Bacatá, in 1538 by Spanish intellectual and lawyer, Gonzalo Jiménez de Quesada, branding it after his Spanish birthplace (Friede, 1960).

Presently, Bogotá comprises 20 different boroughs or localities: Usaquén, Chapinero, San Cristobal, Sante Fé, Kennedy, La Candelaria, Tunjuelito, Mártires, Antonio Nariño, Fontibón, Suba, Engativá, Barrios Unidos, Puente Aranda, Rafael Uribe, Teusaquillo, Usme, Bosa, Ciudad Bolívar and Sumapaz, establishing a population metric of 8.74 million citizens (CIA, 2014). An additional 11 independent metropolitan (and singular municipalities separate from Bogotá) include Chía, Cota, Soacha, La Calera, Funza, Mosquera, Tabio, Tenjo, El Rosal, Madrid, and Cajicá, raising cumulative metropolitan population figures to approximately 12 million inhabitants (CIA, 2014).

Bogotá has the third highest altitude of any city in South America outside of Quito, Peru (2), and La Paz, Bolíva (1) (CIA, 2014). The unique geographical locus of Bogotá insures moderate spectra of temperature fluctuations (avg. daily range: 58 - 70°*F*) as well as recurrent, near-daily precipitation, yet gelid (48 - 55°*F*) twilight conditions. Nationally, Colombia has the third highest rate of precipitation in Latin America, and eleventh in the world (Proexport, 2013).

Establishing a strategic fjord into the continent from Panama, Colombia promises a diverse range of geological and biological diversity throughout the republic, which tenures the world's largest moorland, numerous islands, and corresponding with coral reef formations, the Amazon rainforest, flat coastal lowlands, central highlands, Andes Mountains, eastern lowlands,

and the pitching knolls and plains of the coffee region. These unique topographies offer a stark contraction and adaptive distinction climatologically, as all areas of Colombia enjoy microclimates (Guerrero, 2014) that characteristically possess stabilized temperatures, favor agronomy as irrigated lands are projected to be 10,870 km^2 (CIA, 2013) of the rich substrate supporting the diverse speciation of the Colombian biome. Volcanically, Galeras (4,276 m) remains one of Colombia's most active sites, erupting in both 2009 and 2010 and is recognized and studied as a *"decade volcano"* by the Internal Association of Volcanology and Chemistry of the Earth's Interior. In 1985, Nevado del Ruiz (elev. 5,321 m) erupted 129 km from Bogotá, killing 23,000 inhabitants. Colombia's highest peak, Pico Cristóbal Colón (Christopher Columbus' Peak) is the fifth highest summit in the world at 5,775 m or 18,946.9 feet (CIA, 2013).

Sumapaz, a mostly bucolic locality of southern Bogotá, is the largest moorland or Páramo ecosystem in the world. Sumapaz is also home to the largest predator and the only surviving *oso* or bear species from South America, the *Tremarctos ornatus* or the spectacled bear. As an affluent and biodiverse network, Colombia conveys an ornamental panorama of both flora and fauna, and is extraordinarily positioned climatologically for agriculture secondary to the immense abundance and stable ecostratification. It must be emphasized that all territories of Colombia experience static annual temperatures that auspiciously arranges agronomy as the national métier of quaestus – for better, or worse.

ECONOMIC DEVELOPMENT

When considering food securities, it is imperative to evaluate the global market position of a nation state across the international political economy and to comprehend the economic development standing of a given nation to determine pecuniary resiliency,

monetary locus, and trade earnings. Economic development classically befalls the function of economic growth, which is the protracted course of economic expansion that results from festooning economic incidents (Sharp, Register, & Grimes, 2010), which determines the development outcome (and strategy to achieve that outcome) of a particular region or state. As the prominent feature for food inaccess is the lack or substantial reduction of purchasing power of inhabitants (World Bank, 1986), it is fundamental to understand local markets and to forestall and gauge how economic growth and international assistance may be of particular utility to downstream shareholders, or target populations.

Economically, Colombia ranks 29th in the world (CIA, 2014), earning 8,009 USD in nominal gross domestic product (GDP), and 8,031 USD per capita GDP nominal (Banco de la República [BDLR], 2014). Current GDP (BDLR, 2014) indicated a 378.3 B USD in strength. Paired with a robust 498 B USD GDP purchasing power parity (PPP), and a GDP per capita PPP of 12,775 USD (International Monetary Fund [IMF], 2013), the nation experienced a GDP growth of 4.2% (CIA, 2014). By preserving 11 free trade agreements (FTA) with 84 countries reaching 1.5 billion consumers, Colombia exceeded the cumulative growth for the world economy was 3.3% and 3.0% for of all Latin America (Proexport, 2013).

The strength of the commodities measured by GDP composition by sector of origin is divided by industry (37.8%), which enjoys a production growth rate of 2.5%, securing a world ranking of 119, accompanied with 21% of the labor force (CIA, 2014). Chief industrial products include textiles, food processing, oil, clothing, and footwear, beverages, chemicals, cement, gold, coal, and emeralds (CIA, 2014).

This examination aids in the determination of a development status and potential administrative alacrity (though not limited to organizational, legislative, executive bodies) to

varying humanitarian conditions. It has been proposed that historical peculiarities are symptomatic of social development, and are described as the capacity to usurp material and intellectual climate to reach a group's ends and purpose (Morris, 2010). These social development traits are:

1. Energy Capture
2. Organizational Faculty
3. Information Processing
4. Projection of Force

ENERGY CAPTURE

Agriculture similarly reports for 6.5% of overall GDP, 12.4 % of entire exports, and 18% of national employment (Guerrero, 2014). Colombia has a high forestry potential secondary to the 17 million hectares of agricultural resource (Proexport, 2013). Specific agricultural products include bananas, coffee, cut flowers, corn, cocoa, beans, rice tobacco, sugarcane, shrimp, and forest products (CIA, 2014). With the inflation rate being measured at 1.94% in 2013, Colombia's economic growth achieved 4.68% (Departamento Administrativo Nacional de Estadistica [DANE], 2014) and forecasted to flux between 4-5% for 2014 (Portafolio, 2014). Service sector remains characteristically robust for developing countries, representing 55.6% of GDP composition by sector of origin (CIA, 2014).

Colombia currently has 6,796 km of crude pipeline, coupled with 4,991 km exclusively dedicated to natural gas (compressed natural gas, or CNG), and additional 3,429 km for other petroleum refined products (CIA, 2013). Existing petro estimations (Agencia

Nacional de Hidrocarburos [ANDH], 2014) indicated an average crude oil production rate of 987,000 bbl/day, receiving a world ranking of 24, meanwhile exporting 777,900 bbl/day for a ranking of 18. Crude oil imports are at a rate of 10 bbl/day a world ranking of 81 (Proexport, 2013). Proven crude reserves are at 2.2 billion bbl as of January 2013, achieving an international ranking of 35, with refined petroleum products produced being established at 313,100 bbl/day, attaining a world ranking of 41, with a consumption of 287,000 bbl/day, and a world ranking of 44 (ANDH, 2014; CIA, 2014). Central Intelligence (2014) metrics pegged exports and imports of refined petroleum goods at 92,410 bbl/day, calculating a world ranking of 46, and 49,790 bbl/day, earning world ranking of 70, respectively. A recent postulate proposed by the Ministry of Agriculture suggests that 7.4 million hectares are apposite for the potential development of bio-fuels (Proexport, 2013).

Industrial opportunity costs are comprised of environmental deviations such as pollution and carbon dioxide emissions from the consumption of energy goods, which was measured at 71.15 million Mt (CIA, 2014). No form of energy is currently synthesized or historically derived from nuclear fuels, as 32.9% of electricity is still generated from fossil fuels, with a preponderance electrical energy (66.6%) produced by hydroelectric plants (CIA, 2014).

ORGANIZATIONAL FACULTY

Manpower approximations indicated that of the 23.09 million in the 2012 labor force (CIA, 2013), there was a continuation of a strong literacy rate (94.1%) coupled with a life expectancy of 75.25 years (CIA, 2014), safeguarding a strong and literate workforce to sustain the forecasted economic growth. Favorable labor density percentages are further maintained by a positive-trending life expectancy at birth being 71.82 and 78.42 years for men and women in 2012 (CIA, 2013), and 72.08 and 78.61 respectively for 2013 (CIA, 2014) consigning the current

population growth rate at 1.1% with 16.98 births / 1,000 citizens, and 5.33 deaths / 1,000 citizens. The percentage of annual increased labor force was 3.05% in 2011 (Proexport, 2013), safeguarding a world ranking of fifth place. By 2011, 4.5% of the GDP was appropriated towards education with child labor statistics showing 9% (988,362) of those aged 5-17 actively engaged in the workforce (CIA, 2013). Recently, the workforce has enjoyed a declining unemployment rate from 10.8% (2010) to 7.7%, a historic low in November 2014 (DANE, 2014). Though 32.7% of the national population remains living below the poverty line (CIA, 2014).

Nationally, Colombia holds a debt of 39.6% of GDP, with an external debt of $85.83 billion (CIA, 2014). Finance markets reflect a central bank discount rate of 4.75% and commercial bank prime lending rate of 11%. Stock of narrow monies remains $42.48 billion, with stock of broad monies at $163.2 billion, up from $153.1 billion in 2012. The market value of publically traded shares are up from $201.3 billion in 2011 to $262.1 billion, with current account balance at -$11.02 billion, reduced from -$12.17 billion. Reserves of foreign exchange and gold are $43.74 billion, up from $37 billion in 2012 (Proexport, 2013).

INFORMATION PROCESSING

As Morris (2010) suggests, literacy and the combined ability to communicate information remains a fundamental determinant and attribute to factor in the computation of a social development index, and as such, Morris' third trait is extrapolated demonstrating Colombia's information infrastructure as invariably resilient. U.S. Central Intelligence (2014) indicates that 94.1 % of Colombia is literate, and that the country has developed a sizable technological infrastructure to support over 500 radio stations, a microwave radio relay system, a domestic satellite system with 41 earth stations, a fiber-optic network linking 50 cities, and 10 satellite earth stations with 6 Intelsat, 1 Inmarsat, and 3 fully digitized switching hubs.

With 6.291 million consumers of local-area network or LAN, Colombia has an international LAN ranking of 27, and 49.06 million consumers in mobile communications (cellular provisions) which positions Colombia internationally at 29 (CIA, 2014). This "mobile user" metric supplants the Departmento Administrativo Nacional de Estadistica human population figures (Proexport, 2013), indicating that cellular customers' demand currently emphasize an essential need for a robust information processing network (CIA, 2014). Current metrics place this network to 15 per 100 for fixed (LAN) line, and *100 for 100* cellular subscribers, which strongly suggest a favorable social development index.

The 2015 World Bank's Doing Business report recognized Colombia as the most business-friendly and the most reformative country in Latin America (World Bank, 2014). Computational metrics from the World Bank has revealed that Colombia holds tenth place globally in Investor Protection, and first in both Latin America and the Caribbean (World Bank, 2014). The Standard & Poor's perspective listed Colombia as "stable" alongside the Fitch Ratings and Moody's Index Listing perspectives for the republic at positive (Bloomberg, 2013). When challenged against other perceived risks in the region, it was determined that Colombia remained as one of the lowermost risks at 119.43 (Proexport, 2013). As stocks of direct foreign investments are $128.1 billion, up from $111.7 in 2012, stocks of direct foreign investments abroad stood $33.7 billion, up from $31.65 billion in 2012 (CIA, 2014).

FORCE PROJECTION

The final trait of consideration when cogitating social development is the projection of force, or simply the capability for one nation state to project *enough* military force against another to overcome the opposing force in order to control land, people, or resources (Morris, 2010). It is also noted that another function of force projection is the reasonable capacity to

deter threats based upon the perception of force by a challenging nation. According to U.S. Central Intelligence (2014), Colombia requires that all males aged 18-24 complete a mandatory service assignment or obligation consisting of 18 months to the National Police (Policía Nacional) or National Army (Ejercito Nacional), the Colombian Air Force (Fuerza Aerea de Colombia) or the Republic of Colombia Navy (Armada Republica de Colombia). Colombian naval forces, similar to the gross hierarchical structures of the United States' Department of Navy, encapsulate both naval aviation and maritime assets, in addition to a maritime infantry unit such as the Colombian IM or Infanteria de Marina, an analogue of the U. S. Marine Corps (CIA, 2014). Unlike the pooled law enforcement and national defense structure and responsibilities of the United States Coast Guard, the Colombian Coast Guard is absorbed into the Colombian Navy chain of command dissimilar to the United States Coast Guard under the command and control of the Department of Homeland Security, lest involuntary congressional or presidential authority enacts the U. S. Coast Guard under the protocol and disposal to the Department of the Navy (CIA, 2013).

In 2012, military expenditures accounted for 3.28% of the GDP (CIA, 2013). The current Colombian defense manpower metrics (CIA, 2013) suggests a deep pool of "available" to "fit" force of military-aged males of 16-49 year-olds. Of the 11,692,647 available military-aged males, it was determined that 9,150,400 are measured to be "fit" for the standing military force; likewise, military-aged females accounts for an additional 9,861,760 fit of the 11,727,625 available of potential armed force. The annual number of males reaching military age annually is 430,634, whereas females reaching military age annually stood at 413,974 (CIA, 2013).

Males wanting to prevaricate mandatory service can recompense a tariff to the government of Colombia, of which is postulated by Title III, Article 28, Exemption in Time of Peace, and is based upon income / tax level of the family, which still requires the citizen to register with the government (CIA, 2013). As expected, many of those who elect out of mandatory service through payment are from the upper echelons or "levels" of society. Though it should be noted that many patriotic volunteers from all socioeconomic backgrounds are within the ranks of military service representing the Republic of Colombia.

Therefore, notwithstanding the characteristic social development caveats inherent to all developing countries, the fiscal political economy of Colombia faces unique challenges (Hartlyn, 1989) secondary to the endemic violence characteristically affronted by the internal conflict between national security forces and various armed actors (Bergquist, Peñaranda, & Sánchez, 2001; Safford & Palacios, 2002). Yet paradoxically, the nation could safely be considered one of the most stable economies south of the United States of America (World Bank, 2014) secondary to administrative transparency and favorable public policies.

LOGISTICS

Historically, Colombia presented a multifarious array of geographical challenges (Renner, 1927) concerning migration, commercial logistics, and military operations (Safford & Palacios, 2002). These complications were traditionally consistent with the demanding terrestrial topography while traversing Colombia, amid proclamations from early explorers decreeing that Colombia bequeaths a "backwardness of travel" (Eder, 1913). This proved fitting in part by the absence or otherwise restrained transportation framework of the republic (Galbraith, 1966). The wide-ranging lack of collaboration between rural settlements was fortified (Thoumi, 2005) by the

deficiency of a transportation infrastructure, which impeded both economic development and national unification (Safford & Palacios, 2002).

Consequently, Bogotá remained an insular metropolis that defied the mantra of many other Latin American countries that built their capital cities unto the coastal limits. For this, to embark for Bogotá from the seaport Cartagena, an individual would have needed to navigate along the Rio Magdalena, which would float them to Bogotá, a modest two-week voyage (Gouëset, 1998). This transportation dynamic proved to be an advantage militarily – especially in irregular warfare (Clausewitz, 1833; Hartlyn, 1986), while coexisting as a caveat for commerce and industry (Helmsing, 1986).

Commercial orchestration and the subsequent development of an infrastructure have abetted the 60.7 billion (B) USD in exports and 59.1 B USD in imports (Proexport, 2013), distinctly indicating the strength of the Colombian transportation administration, although many municipalities are not as adroitly defined by such appraising metrics. Cumulatively, Colombia has 874 km of railways with an international ranking of 95 aligning the country amongst nations with similar infrastructure and development indicators (CIA, 2013). Initially alleged to have only 120 km of roads (Galbraith, 1966), current CIA approximations catalogue about 141,374 km of roadways (CIA, 2013). The seemingly low number of roads is principally due to the aggressive landscape and an extensive rain season (Renner, 1927), and not perceived to be secondary to a weakened logistical infrastructure.

On behalf of seafaring logistics and operations, the commercial and industrial seaports servicing the Atlantic Ocean (Caribbean), are located in Cartagena, Santa Marta and Turbo (Proexport, 2013). From the Western seaport of Buenaventura, both freight and commercial vessels are launched for North Pacific voyages (CIA, 2013). A river port in Barranquilla

provides entry to the Rio Magdalena (Gouëset, 1998), the lengthiest navigable river (1,448 km) resultant of the frequent dredging maintenance which safeguards secure passage of container barges and cargo vessels (CIA, 2014).

The twelve international airports include El Dorado International Airport, located in Bogotá; José Maria Córdova International Airport located in Medellín; Rafael Núñez International Airport located in Cartagena; Alfonso Bonilla Aragón International Airport located in Cali; Ernesto Cortissoz International Airport located in Barranquilla; Simón Bolívar International Airport located in Santa Marta; Gustavo Rojas Pinilla International Airport located in San Andrés; Matecaña International Airport located in Pereira; Alfredo Vásquez Cobo International Airport located in Leticia; Camilo Daza International Airport located in Cúcuta; Palonegro International Airport located in Bucaramanga, and El Edén International Airport located in Armenia, Colombia (CIA, 2013).

Cumulatively, Colombia possesses 836 airports and 3 heliports (CIA, 2013) and is accordingly ranked third in the world in consumer aviation competence. Of these airports, 715 are unpaved (CIA, 2013), and it is predicted that many of these airfields are in remote regions of the country displaying limited carrying capacity of traditional logistics, analogous with demand trends. In 2013, it was determined that 488 of unpaved airstrips are less than 918 meters, whereas only 18 of the 121 paved strips were less than 914 m (CIA, 2013). With the arduous terrain of Colombia, modern avionic capacity becomes the novel solution for consumer logistic plight, as the exceptional capacity of Colombia's aviation competence is anticipated to overcome what logistical limitations that may exist by traditional road or railway transportation (Galbraith, 1966).

DISPLACEMENT

In 2002, the United States Committee for Refugees predicted that 13 million people worldwide would be displaced (United States Committee for Refugees [USCR], 2002). This human dislocation interchanges the disjointed towards larger municipalities (Ravenstein, 1885), and in the case of Colombia, these migration arrangements often begin intradepartment, or towards modern megalopolises such as Bogotá or Medellín (Ibáñez, 2008). Although household finances have historically prevailed the rationale for migration, forced displacements are often uniquely characteristic of the finality and coerciveness of violence and /or threat of violence fixed with the struggle for land (Bergquist et al., 2001), a distinct violation of human rights (IDMC, 2013). Wherefore, an alterity occurs between those internally displaced and those exhibiting income-based migration patterns (Ranis & Fei, 1961), such as various human capital theories (Todaro, 1969). Both itinerants espouse the customary principles of Ravenstein's postulate --- that migrations oblige and observe the following principles (Ravenstein, 1889):

1. Initially, most migrations are limited in distance, and towards larger municipalities
2. Rapidly growing cities are populated by rural immigrants
3. Analogously, distribution is the inverse of absorption
4. Each current of migration produces a compensating countercurrent
5. Long-distance migrants tend to move to larger cities
6. Rural residents are more prone to migrate than urban counterparts
7. Women are more expected to migrate than men

The human capital flight as a conventional diaspora is similar to the "brain drain" which conforms to conservative human capital theory (Plane, 1993), and remains indicative of household economics (Ranis & Fei, 1961) amid growing public safety concerns (IDMC, 2013). This tendency currently aligns with Ravenstein's third law of migration (Ravenstein, 1885), similarly corresponding the conservation of absorption following a dispersion effect reflecting a 1:1 inverse.

This brain drain phenomenon remains dissimilar to conventional diaspora as it specifically supplants substantial human capital – human talent, skill and intelligence (Sachs, 2005) to other countries for both personal and / or intrafamilial finances and safety (Carrillo, 2009). A technical divergence between the dichotomies (i.e. brain drain & human capital flight) is maintained by respective bastions of intellectual thought: the former representing sociologists, the latter a preference of economists. This body of work will attempt to provide a unifying approach in regards to disjointed populations, but will emphasize the empirical decisiveness of direct and indirect economic outcomes and interrelated remediation strategies.

In Colombia, economic routes have further aided the disjointed during the years of 2000-2006, while 25% of internally displaced persons (IDPs) were found to be ingressing into Sincelejo, Santa Marta, Valledupar, and Florencia (Sayago, 2010). These represent smaller Colombian municipalities, but still conform to Ravenstein's doctrine of migration (Ravenstein, 1889). Amid the forced displacements descends the comprehensive struggle to maintain or regain landownership (Fadnes & Horst, 2010). This persistent struggle to control space (Bergquist et al., 2001) for economic, military and political motives have guided the displacement of nearly 13% of Colombia's population and the unlawful seizure of 14% of

Colombia territory, some 8 million hectares of land (Amnesty International, 2014). These figures also reflect abandoned land of indigenous populations (Tovar-Restrepo & Irazábal, 2014).

From 2000-2005, it was thought that 1.2 million Colombians have migrated from the republic permanently (Hudson, 2010). In 2002, 373,020 Colombians were forcibly displaced, with over 2,900 kidnapped, over 500 disappeared, and more than 4,000 noncombatants slaughtered (Amnesty International, 2003).

In 2005, the Colombian statistics bureau, Departmento Administrativo Nacional de Estadistica, determined that over 3.3 million citizens permanently reside internationally (DANE, 2005). That year alone saw 99,900 citizens who sought asylum in another country, with 34,600 inhabitants relocating to the United States, 23,000 immigrating to Spain, and 20,000 seeking refuge in neighboring Venezuela (DANE, 2005).

The demanding terrestrial landscape of Colombia has historically favored (Hartlyn, 1986; Safford & Palacios, 2002) the rebellions and revolting ensembles of illegally armed groups in irregular warfare (Clausewitz, 1833; Griffith, 1992), fracturing the state into regions of various control (Holmes et al., 2008). This violent control of resources extends from land (Bergquist et al., 2001) to human capital. By provoking displacement, numerous armed actors are presented an opulent opportunity to illegally seize territory (Albuja & Ceballos, 2010).

Previously, it was questioned whether aid to internally displaced populations were similar to aid received by refugees. This is an important consideration as intelligence has formerly questioned whether this aid acts as a negative externality that augments leftist political violence, and whether providing such humanitarian aid to the internally displaced populations essentially inflame conflicts (Holmes & Gutiérrez, 2011). As advocated by Holmes & Gutiérrez (2011), aid to the internally displaced should not be treated the same as refugee relief, as these groups

contrast in noteworthy modes other than traversing a national border whilst fleeing violence. In Colombia, internally displaced populations are conventionally dispersed as opposed to being administered in cohort, or focused in camps. And despite difficulties concerning reintegration, those internally displace tend to have a favorable chance of successful assimilation than refuges, based on citizenship (Holmes & Gutiérrez, 2011).

CONFLICT

Globally, conflicts and civil wars has been on the rise (Kaldor, 1999) and countries in Latin America face no extraordinary exception (Chomsky, 1999). Contemporaneously, Colombia still suffers from a protracted civil war (Prado, 2000), which has also been described as an internal conflict, or an intense insurgency (Holmes et al., 2008). This internal conflict has inundated the nation since the 1950's (Centro Nacional de Memoria Histórica, 2013), creating a formidable humanitarian crises (Mejía, 2011), which is often considered the worst in the southern hemisphere (IDMC, 2013).

When the 1948 assassination of Jorge Eliécer Gaitán befell, the hopes of millions of impoverished and browbeaten Colombians too, collapsed. Jorge Eliécer Gaitán represented a new sense of national optimism as the dissident Liberal Party member after his public condemnations of the conservative government's role in the Colombian army's 1928 massacre of striking banana workers in Ciéaga (Leech, 2001). Gaitán accused the Colombian Army of massacring striking banana workers on behalf of Boston-based United Fruit Company, a commercial ancestor to Chiquita Fruits International. Gaitán was also instrumental in labor and agrarian reform bills, the first becoming passed in 1936 (Bergquist, Peñdaranda, & Sánchez, 1992). Following the assassination of Jorge Eliécer Gaitán in 1948, the killing created the liberal uprising which induced a decade-long civil war between Liberals and Conservatives known as

La Violencia, or The Violence, where more than 200,000 are killed (Bergquist et al., 1992; Chacón, Robinson, & Torvik, 2011).

The brutal crisis fetches formidable idiosyncrasies (United Nations High Commissioner for Refugees [UNHCR], 2006; Plane, 1993) such as countrywide massacres, disappearances, and the substantial volume of internalized displacement of Colombians (Holmes et al., 2008) – a harrowing phenomenon that currently leads the world (IDMC, 2013). This conflict has significantly decreased the national security, public safety, and previous investment ratings of the republic (Mejía, 2011). By August 1999, the credit score of Colombia dropped below investment grade by Moody's Investment Service, which severely damaged international investments and national borrowing unilaterally. In 2011, Moody's recovered Colombia's credit to a favorable rating, providing that the economy remained stable (Bloomberg, 2012).

Outside the measured strategy to seize and control land for resources, the forced migrations have also been described as a mechanism to weaken armed adversaries (Engel & Ibáñez, 2007) by procuring insurgent staging areas, among other prospective guerrilla / paracos enterprises (Leech, 2009). Far too often, commandeered rural properties often become appropriated for narco development, such as coca production (Bergquist et al., 2001; Streatfield, 2001), which produces sizeable profits and value to the newly assimilated territories. According to Amnesty International (2014), subjugated landowners / property caretakers are commonly exposed to unrealistic "taxes" or ransom payments to competing antagonist groups such as rebel fighters, paramilitaries, or security forces. Estimations of land tenure by various drug cartels range from 33% of the country's agrarian land (Economist, 1994), to 42% (Knoester, 1998), a significant percentage once measured against the strength of the agricultural sector, 6.5% of total GDP (Guerrero, 2014).

Given these figures, and the fiscal presumption that supply currently meets both the national and international demand for agricultural goods, the national loss of potential agriculturally based GDP is floodlit secondary to the illegal land tenure manifested by participants of the narco trade. Though it cannot be assumed that all agrarian land controlled by narcoterrorists or drug cartels are being exploited exclusively for the production of illicit crops, it can be reasonably predicted that an inordinate proportion is, and that it remains rudimentarily decreed simply through the law of demand. This conserves that value remains a fixture to the flux of supply and demand, though the microeconomics of narcotrafficking regarding illegal surplus preserves less of a stake.

With very little to readily convalesce the sociopolitical-derived disorder, the assiduous human ingression to metropolitan cities (Johnson, 2003) has been historically and classically indicated as a consequence of sustained conflicts (Hudson, 2010; Ravenstein, 1885). Among the diverse troupes of the Colombian insurgency, are the revolutionaries and contrarevolutionaries in a violent power struggle for resources, land, and political exemplification, which leads to numerous arrangements of human rights violations for nonparticipants, or to those whom are merely suspected of being sympathizers to the opposing faction (Pardo, 2000; Engel & Ibáñez, 2007). This has traditionally provoked mass human transposition through oppression, cruel coercion and massacres (IDMC, 2005; States News Service, 2011). This condition is also dealt to victims by the narcotrade (Streatfield, 2001), which controls up to half of the country's nutrient-rich soil (Knoester, 1998).

This conflict has unilaterally devastated millions of victims, and throughout just 1985-2012, there were over 220,000 killed, with 25,000 forced disappearances due to the internal conflict (Centro Nacional de Memoria Histórica [CNMH], 2013). Of the dead, *80% were*

civilians or noncombatants. The Office of the Comptroller General, Office of Human Rights Ombudsman and the Office of the Procurator General furthermore recognized a total of 6.4 million victims of the conflict, almost half of who are women (Comisión de Seguimiento y Monitoreo a la Implementación de la Ley de Víctimas y Restitución de Tierras, 2014).

In November 2008, the Brookings-Bern Project on Internal Displacement (a Brookings Institution and University of Bern venture), Acción Social, the Universidad de los Andes, and the United Nations High Commissioner for Refugees (UNHCR) assembled in Bogotá to speak to the challenges of responding to the needs of internally displaced persons and their corresponding communities (Ferris, 2008). As Ferris (2008) reports, recommendations were made to back the potential optimizations of both the monitoring process and infrastructure as well as the implementation of national policies to individual municipality levels thereby improving the observation and implementation of benchmarks, and creating modalities to handle public safety crises (Elhawary, 2010).

Later, a discourse and action strategy for national oversight of regional and local attitudes exposed prevailing behaviors at operational levels that adversely impinged upon the lives of beneficiaries and shareholders (Ferris, 2008). It was also discovered that animus concerning the displaced was correspondingly prevalent by unreceptive communities (Molano, 2005) as well as discrimination, racism and biopolitics (Pinzón-Rondón, Hofferth, & Briceño, 2008).

Recent findings (Sandvik & Lemaitre, 2013) have also endorsed that women play an increased role as knowledge producers, investors, and users in humanitarian actions that secure the wellbeing of the household or community, a sentiment echoed throughout various humanitarian bodies (Zapater, 2007; Taylor, 2011) as women overwhelmingly represent the

52.4% displaced in Colombia (Economic and Social Council, 2005), as many of the men from the origin of displacement are annihilated.

According to the Consultancy for Human Rights and Displacement (Consultoría para los Derechos Humanos y el Desplazamiento [CODHES], 2014), another 220,000 IDPs were to join the overwhelming amount of some six million Colombians displaced in 2013. These contemporary figures (CODHES, 2014) validate that forced migrations and displacement is nevertheless greatly predominant throughout the country. Largely, areas of localized dearth and extreme food insecurities can be expressed as a direct function of the uncontrolled synergistic effects of diaspora, class warfare, and extreme poverty or insolvency in Colombia (Ibáñez, 2008). These tacit penalties are logically implied as the sui generis of the Colombian conflict (IDMC, 2013), as the internalized diaspora places a distinctive load to the delicate cantilever of destitution, particularly impacting families seeking refuge within urbanized comunas, or city slums.

Here, violence again becomes the universal symptom for the struggle of land ownership, or space. As these areas experience extraordinary population dynamics, contemporary violence is no longer isolated to the rural spaces, but fundamentally coexists in urban formats, as the three recognized modalities of urban violence proposed by Bergquist et al., 2001:

1. Thriving death industry
    a. Market dynamics propagated by sicarios (hired assassins)
2. Popular militias
    a. Within insolvent zones and comunas such as Ciudad Bolívar
3. Social cleansing
    a. Commonly by police, ex-police proxies, or paramilitaries

RIGHTWING ACTORS

Among the actors ensnared in the conflict disconcerting Colombia is that of the rightwing, which in effect supports the democratically elected administrations, yet function as politically insulated militias or paramilitaries such as the United Self-Defense Forces of Colombia (Autodefensas Unidas de Colombia or AUC), and Autodefensas Gaitanistas de Colombia (Autodefensas Gaitanistas de Colombia or AGC) who were monetarily retained and contracted by both the Colombian military and the wealthy to eliminate the socialist clauses and to protect regional interests (Ashley, 2011). Through this medium, paramilitaries such as the AUC have committed brutal atrocities against peasants for intelligence regarding guerilla movements, and committed massacres against sympathizers or those suspected of cooperating with the insurgents (Livingstone, 2009). Many atrocities were conducted without consideration to women or young children (Livingstone, 2003), and because of the unique nature of savagery involved, the AUC was officially designated a terrorist organization by the United States of America (Ashley, 2011).

Political assassinations remain today as a protracted condition of public safety in Colombia (Steele, 2011). On January 6, 2014, the Secretary General of the Confederation of Workers, Fabio Arias confirmed the first political assassination of the year as a Unionist El Ever Marin was shot to death at a bus station earlier that morning (Espectador, 2014); Arias further reports that in 2013 alone, 28 murders were directed to the Union party leaders, up from 23 assassinations for 2012. Within the spectrum of years (2011-1984), the United Nations Program for Development (UNDP) reports that over 2,800 Unionists were killed (UNDP, 2013). The organization (Union Party) further contends 216 forced disappearances, 83 tortured and 163 kidnappings. 14% of the assassinations are committed by rightwing

paramilitaries, 5.1% by leftwing guerrillas, and 1.7% by state agents. This continued violence in the labor and business sectors are further supported by Arias' claim that, "The union violence remains strong in some business sectors and government of the country" Espectador, 2014).

Another paramilitary which gained its origins from the AUC is the Águilas Negras, or Black Eagles, which is the consequential precipitation of various Colombian rightwing, counter-revolutionary, paramilitary organizations comprising of fresh and foregoing paramilitaries, which materialized after paramilitary demobilization proceedings of 2004 – 2006 (Ashley, 2011), whose preliminary purpose under the direction of President Álvaro Uribe was the dissolution of the AUC, and other rightwing militias / paramilitaries.

Formerly a very formidable force with inordinate numbers, today derivatives of the AUC are currently sustained as players in the conflict due to illegal sources of funding, such as narcotrafficking (Ashley, 2011). U. S. intelligence analytics implicate that the Black Eagles are armed liaisons that have bridged a gap from paramilitarism to functioning as a highly-organized gang and syndicate. As former AUC leader Vicente Castaño (brother of AUC founder, Carlos Castaño) assisted in the formation of the Águilas Negras (CIA, 1997) , which are preserved as an official paramilitary organization that functions as a posse of former paramilitaries with direct dealings in the narcotrade, having an established link and commerce between both the guerrilla and drug cartels freestanding from Colombia (Bergquist et al., 2001). Recent (2007-2008) intelligence reports (Semana, 2008) indicate that the Black Eagles' activity in Barrancabermeja interfaces with past pedigrees arising from the Norte de Santander department in 2006, and failed demilitarization attempts of the AUC,

thereby maintaining close association with the illicit endeavors of the Los Urabeños (Semana, 2008).

Analogous to most rightwing paramilitary models, the Black Eagles are both interconnected and related to narcotrafficking endeavors, kidnappings, extortions, and homicides of its precursory groups (Livingsone, 2003), often focusing efforts against leftwing sympathizers and socialist party members (Bergquist et al., 2001). Growing numbers of peasant massacres accumulated in 2013-2014 (Amnesty International, 2014). Modern criminal organizations in Colombia may consist of over 4,000 members dispersed into 22 notoriously acknowledged factions in over 200 municipalities and across 22 of the 32 departments nationally (Restrepo, 2011). The numbers of groups are speculated to be 34, due to their capacity to fleece various operations for tax purposes and ability to evade detection and discovery (Holmes, Gutiérrez de Piñeres, & Curtin, 2008). In 2013-2014, an alarming number of peasant massacres continue (Amnesty International, 2014).

Aforementioned, the leadership of the Black Eagles are outwardly comprised of demobilized paramilitary commanders – either those who voluntarily opted out of the government sponsored peace process or those who were forcibly enrolled into the Black Eagles. The lower levels of the organization appear to entail swaths of recruits stalwart to drug trafficking operations. The Black Eagles have fostered upon the remaining criminal networks established by innumerable paramilitary and narcotrafficking blocs throughout Colombia, but without acclimating the same martial, or military hierarchical substrata previously found and exemplified in preceding paracos organizations.

Currently, the various insular factions of the Águilas Negras seemingly do not respond to one another, or function as an illicit federation. They are not known to control any

transnational routes for the shipment of cocaine, which suggests a rationale to the massacres in coastal towns such as Buenaventura (Amnesty International, 2014), a principal shipping outlet to the Pacific coast (CIA, 2014).

Once within urbanized slums, the modus operandi of the Black Eagles is that they customarily broadcast their initial presence by circulating leaflets and pamphlets throughout a community. Usually, these will pronounce the obligation of an evening curfew, announce and declare their contention with another local mob, mafia, or gang, and to threaten and menace the community with "social cleansing" (Restrepo, 2011). This is consistent with conventional rhetoric and espouses biopolitical theories (Di Muzio, 2008) formerly developed by the AUC in order to subjugate communities and impose social control within a given expanse (Ashley, 2011). The following is a listing of Black Eagle units in operation throughout Colombia:

Águilas Negras de Catatumbo: Operating in Cúcuta, Chinácota, El Tarra, Tibú, El Zulia, Puerto Santander, Ocaña and Aguachica (Approximately 15 to 360 members)

Banda Santander: Operating in Riohacha and Maicao, La Guajira Department (Approximately 30 members)

Los Rastrojos: operating in Cauca Department and Valle del Cauca (Approximately 1200 members)

Mano Negra: Operating in the Putumayo Department (Unknown)

Nueva Generación: Operating in Nariño Department (Approximately 300 members)

LEFTWING ACTORS

Congeners of the leftwing consist of socialist parties that embrace Marxist principles and / or the tenets of Socialist Theology usually coupled with armed militias. The concepts and philosophical standards of the left are consistently based upon the uniformity of the republic, its residents, and the delivery of equality irrespective of domestic social class, and respires governing collectivism. Often presenting a quixotic notion to an already prevailing capitalist dominated model, the leftwing has historically struggled to gain political representation amid negotiations and divergence with various administrations.

The current players representing the left are the Revolutionary Armed Forces of Colombia People's Army, known as the Spanish-derived acronym FARC (Fuerzas Armadas Revolucionarias de Colombia), and the National Liberation Army or Ejército de Liberación Nacional (ELN). Preexisting leftist movements include the 19th of April Movement (M-19) also identified as Movimiento 19 de Abril, a former physiognomic revolutionary influence in Colombia (Ashley, 2011).

M-19

Sculpted from comparable South American guerrilla groups such as the Argentinian Montoneros, and the Uruguayan Tupamaros motivated the formation of M-19. After the ostensibly duplicitous presidential elections of April 19, 1970 when the previous military dictator Gustavo Rojas Pinilla of the National Popular Alliance (ANAPO), was deprived of an electoral triumph, M-19 materialized into an urban socialist militia (Ashley, 2011). The philosophy of the M-19 was an amalgamation of nationalistic revolutionary socialism, pooled with terrorist manifestos.

At the height of M19 terror, the organization conducted the Palace of Justice Siege - an attack dating to November 6, 1985, which held 300 hostages including Supreme Court Justices, of which 11 of the country's 21 was killed, in addition to more than 100 total killed in the guerrilla operation. By mid-1985, when the number of active members was estimated at between 1,500 and 2,000 (including a more noticeable urban presence), the M-19 was the second largest guerrilla group in Colombia after the Revolutionary Armed Forces of Colombia (FARC). Similar to the Uruguayan MLN-T (Movimiento de Liberación Nacional-Tupamaros) or Tupamaros (Churchill, 2014), the urbanized guerilla influence of M-19 had become notorious for a number of awe-inspiring engagements and activities that provoked conflicting feelings of both amazement and anger among the different divisions of Colombian public opinion.

Following an effective demobilization, M-19 transformed and converted to a sole political party, designated as the M-19 Democratic Alliance (Alianza Democrática M-19), or AD/M-19. This served as the political precursor to the current effigy of whose effects can nevertheless be apportioned to contemporary epochs - such as the current executive officer and mayor of the capital district of Bogotá, Gustavo Petro, a former militant member of the M-19 terrorist group, who currently holds the Bogotá Mayoral office from 2012 - Present (Alcadia Mayor, 2014). The Bogotá mayor post is considered the second highest position of Colombian executive command behind the President of the Republic.

FARC / ELN

Together, the FARC and ELN possess a dogmatic monolithic ideology that comprises social equality and an improved redistribution of wealth for the citizens of Colombia. The FARC exemplifies the tenacity required of the lengthiest insurgency in the world (Leech,

2011), pugnaciously striving for the representation of either philosophy as a whole, or the fragment therein through a complete revolution, or armistice since the peasant conception in 1964 (Leech, 2011) seeking land and impartiality for the poor. Simply put, this Marxist vision reallocates the prosperity of the nation throughout the classes of the population offering uniform access to rudimentary privileges and realizing the fundamental characteristics of a developed country, i.e. favorable public policy involving education, healthcare, and food – with normalized access and social / singular costs. Because of the existing social dynamics of poverty, education inaccess, food insecurities, amongst perceived governmental corruption, these embraced social tenants could be arranged as a viable collective solution – if not without interdiction of other States who would not benefit from such a radical governmental realignment.

Historically the FARC has been unable to eschew the executive level corruption that has plagued existing administrations of the movements which has been one of their largest and poignant criticisms from the socialist inception. Also, their inability to desist from attacking civilian populations through the veil of terrorism - such as the Bogotá car bombing of the El Nogal country club in February 2003, killing more than 20 (Holmes et al., 2008). These terrorist exploits have further isolated the group from popular mainstream opinion and international sympathy. As these terror-filled militarized efforts have launched the FARC from a peasant socialist movement with a romantic foundation to a terrorist organization seeking the violent overthrow of an establishment by the successful kidnapping of presidential candidate Ingrid Betancourt (Betancourt, 2010), and the attempted assassination of Senator Alvaro Uribe (who later held Presidential office) and the successful murder of his father, in June 1983 by the 36 Front of FARC (Leech, 2011).

The casuistic political position of the FARC & ELN are further undermined by narcotrafficking efforts among other illegal radicalized activities such as kidnapping and extortion which have compromised the political inviolability of the groups to becoming listed as terrorist organizations by the State Department of the United States of America (Ashley, 2011). Currently, the FARC are pushed into the hinterlands of Colombia with executive-level command and control elements mostly exiled to Venezuela and Havana, Cuba.

In 2004, the leader of the FARC, Simón Trinidad was apprehended in Ecuador while attempting to contact UN officials in an effort to organize a prisoner exchange between the revolutionary group and the Colombian government. He was captured and repatriated to Colombia then extradited to the United States to stand federal prosecution charges against kidnapping and drug-trafficking charges. Trinidad remains the highest-ranking FARC commander to ever be captured and tried in the United States (Leech, 2001). In 2008, the leader of the FARC, Raul Reyes was targeted and destroyed while in exile to northern Ecuador in March 2008 by a GPS-guided precision-guided munition (PGM), a U.S. weapon system used in alliance with Colombia, and U.S. intelligence assets (Priest, 2013).

This incident, created a political maelstrom between Colombia and Ecuador as the exposure revealed a violation of sovereignty by Colombia, a condition that violated protocols established by the Organization of American States (OAS), and created a near diplomatic crisis with Ecuadoran President Rafael Correa. Priest (2013), outlines the United State's secret role in providing millions in funding, weapons, and intelligence assets to aid Colombia in the destruction of the FARC, further impairing the modular relationship of Colombia and the United States to Ecuador. A confirmatory statement (Priest, 2013) regarding the collaboration between United States intelligence and military to Colombian forces in the

secret protocol was obtained from the ex-President Uribe ’02-’10, and from Minister of Defense, who added that the Colombian soldiers directly involved with the highest of profiled missions were in fact Colombians though this was merely implicit that ground troops were collecting DNA samples, and not to the assumption of a ground conflict.

Though other right-wing players were still at-large and have historically posed a greater threat to the general population than the FARC (Leech, 2011), the targeting of Reyes was independent from the United States’ Plan Colombia initiative, which is poised to confront (with all necessary force) narcotrafficking and all troupers of the internal conflict (Bergquist et al., 2001). The exodus of FARC command elements has drawn disastrous effects that have trickled down into the lower ranks of the organization fracturing troop morale and inevitably creating mass desertions among other nefarious effects such as internally-derived sabotage, and espionage (Leech, 2011).

The sustained yet sporadic episodes of leftist-inspired violence and acts of terrorism towards the Colombian National Army and Police, notwithstanding the civilian collateral or targets, has led to the failed potential political standing and congressional representation, which has not been recognized by the current Santos Administration. Among erstwhile entreaties such as land / property distribution which are present-day conditions to the possible ceasefire between the FARC and the Colombian Government, the guerrilla militias have failed to discern their terrorist tendencies in hopes for the exchange of an olive leaf and amnesty. Expectedly, the chief sources of financial strength of either party (FARC / ELN) remains to be from illegal activities such as kidnapping and narcotrafficking (Leech, 2011).

Until a bilateral ceasefire has been declared and the socialist parties concur and coincide to demilitarize completely, it is highly suggestive that the internal conflict in

Colombia will resume the proven course spiraling the current domestic conditions and disintegrating society further. The unvacillating nature of political regimes, historically, holds little conviction that a solution or manifest can be achieved without all players forming a covenant or conversely, through chaste martial supremacy. Unfortunately the latter is far more favored for the majority, as most Colombians are simply exhausted of the conflict – yet most somehow find sufficient vigor and élan for both the retribution and annihilation of the guerrillas – versus a ceasefire and amnesty strategy that is currently being explored by the administration.

FOOD INSECURITY

Food security can be described as the qualitative degree for the capacity of individuals to procure safe, nutritionally sufficient foods (Life Sciences Research Organization, 1990). Through this, food security can therefore be extrapolated as a communal dynamic that intercalates poverty, crime, education, and overall health as many food insecure and hungry populations suffer from malnourishment that can lead to anthropometric changes (Wilde & Peterman, 2006). The World Bank further describes food security as the universal access to appropriate nutrition for an active healthy lifestyle (World Bank, 1986); hence, food insecurity is expressed throughout this body of work as the corresponding failure or disruption of the boundary conditions established by the aforementioned explanations.

Food insecurity customarily prompts biological transformations to those distressed or undergoing alimentary difficulty in obtaining obligatory nutrients to satisfy biological output. These anthropometric deviations such as wasting, neural tube defects, pediatric stunting, and intrauterine growth restrictions (Black et al., 2008; Milunsky et al., 1989) are often presented in populations suffering from chronic sustenance insecurities and pediatric malnutrition.

These disorders were determined to be responsible for 21% of disability-adjusted life-years (DALYs) for children less than 5 years old, and accounted for a total of 2.2 million deaths (Black, et al., 2008) globally. Altogether, pediatric stunting for children less than five years old reached a reproachful approximation of 178 million (Black et al., 2008). Of the 160 million children experiencing from pediatric stunting, it was established that these figures exist in *only* 36 countries, characterizing the 46% of the cumulative 348 million children inhabiting corresponding countries (Black et al., 2008). Both intrinsic and extrinsic influences have been interpreted that are associated with food security subsidies such as the Mejoramiento Alimentario y Nutricional de Antioquia (MANA) programming in the Antioquia department of Colombia (Hackett, Quinonez, Taylor, Uribe, & Martha, 2010), promoting amended monitoring and evaluation for shareholders.

Suggested determinants of pediatric food insecurity such as educational attainment, employment status, domestic structure, housing tenure, and household income, including the region of birth and age of the child, were previously probed and challenged with Rasch analysis in Australia (Ramsey, Giskes, Turrell, & Gallegos, 2011) and Colombia (Carmago, Quintero, & Herrán, 2012). It has remained well known that together poverty and alimentary difficulties lead to a multifactorial disintegration of corporeal states (Encuesta Nacional de Salud Materno Infantil, 2009). These synergistic collapses are not limited to academic performance, resiliency, or academic buoyancy (Martin & Marsh, 2009), as recent insights indicate that food securities can siphon pedagogic outcomes by an average of 13 IQ points (Mani, Mullainathan, Shafir, & Zhao, 2013); these sustenance pressures are anticipated to be direct contributory influence or casual factor to reduced cognitive function in children.

Chronic food insecurities can often lead to severe hunger or famine-like conditions, which later can be prescribed as recruiting stratagems in the conscription of various terrorist or radical / extremist models (Jenkins, Scanlan, & Peterson, 2012). It is therefore imperative for regions saturated with conflict to assuage such food anxieties apolitically to limit the coerciveness of food fare in campaigns rooted in violence and human carnage. As for the insatiably ravenous, the resolution and value of life is commonly overwhelmed with existence and survival, and accordingly, the dogmatic ideology or philosophical rhetoric of extremism becomes immaterial to the very satiety one pursues.

A preponderance of heads of households under these alimentary pressures will migrate to larger communities (Johnson, 2003; Ravenstein, 1885) and will first establish habitation and income prefacing the rest of the household (Engel & Ibáñez, 2007). A provisional inverse is also implied once younger members of a household migrate first into a receptor community to avoid recruitment into armed groups such as leftist guerrilla groups or rightwing paramilitaries (Engel & Ibáñez, 2007). Both ephemeral instances validate the structural nature of migration on behalf of opportunity (Kadlin, 2008; United Nations Commission on Human Rights [UNCHR], 1998), either for personal or household economics (Lewis, 1954), personal safety (IDMC, 2013), or food (UNCHR, 1998). Together, these instances still submit to Ravenstein's decrees of migration (Ravenstein, 1889) and espouse human capital theory (Plane, 1993), fixing the dislocated along the most economic routes in reaching their food security objective.

Throughout Colombia, it was recently estimated that 41% of families experience a particular form of food insecurity (Encuesta Nacional de la Situación Nutricional en Colombia [ENSIN], 2005). Of the nutrient constituents deemed inadequate by ENSIN, stood dairy and meat proteins. When scrutinized within the concentrated population of 8.7 million citizens of

Bogotá (CIA, 2014), 76% experience similar food insecurities (Isanaka, Mora-Plazas, Lopez-Arana, Baylin, & Villamor, 2007), revealing an overwhelming metric of 6.6 million Bogotános who remain food insecure. Distressingly, these Bogotá figures correlate expectantly with other population-dense South American cities sharing similar sociodemographics and socioeconomic inequalities such as Caracas, Venezuela (which suffers at a food insecurity rate of 64%; Mercado & Lorenzana, 2000).

Populations comprehensively distraught with food insecurities are often incapable to obtain equitable resources for meat (ENSIN, 2005) and regularly rely upon native or local flora such as plantains, legumes, tubers, and rice for sustenance relief in rural poor communities (Wilde & Peterman, 2006). This emblematic behavior is a distinctive feature for Colombia, as a substantial portion of the national GDP (6.5%) is derived from agronomy (Guerrero, 2014), a figure suggestive of a robust surplus of indigenously produced basic food goods. Analogously, it was established that nutrient deficient, elevated caloric substitutions by the urban poor were regularly consumed (Wilde & Peterman, 2006). These urban caloric provisions were routinely observed by the researcher to be processed food goods such as fried plantain chips, Chocoramo's, and other high caloric snack items high in carbohydrates and fats, which were acutely immaterial, in nutritive value. As anthropometric aberrations have reliably recognized food insecurities as dependable predictors of underweight children (Wilde & Peterman, 2006), lifespan and gender divergence correlations revealed that both overweight, and obese adults --- specifically in adult women who suffer from comparable arrangements of sustenance anxieties, to be a profound phenomenon within nation states with similar economic development status (Townsend, Peerson, Love, Achterberg, & Murphy, 2001).

Within the Colombian megaslum of Ciudad Bolívar, there are essentially no large-chained franchises or super / hypermarkets in the sector. The insecure tenure of those surviving in slums is universally characterized by informal economies, violence, vice, segregation, substandard housing configurations, overcrowding, inadequate infrastructure, and vulnerability to natural disasters (Diley, 2005; Farmer, 2005; United Nations, 2000). Moreover, irregular placements of small convenience store-like "microtiendas" may contour the busiest of pedestrian corridors and pathways of the slum, which resembles the convenience stores / minimarkets of domestic inner cities, mirroring food desert-like conditions, respectively. These tiendas often provide customers with a form of microcredit or food goods that placates immediate or temporary needs.

Mitigating global food insecurities is an interdisciplinary pitch of monitoring and evaluating risks (World Bank, 1986), current programming, and future convalescence (Alexander, De la Barra, Goss, & Segokgo, 2014). Through the Declaration of the Millennium Development Goals, it was advised by the United Nations to improve food securities and enhance existing poverty remediation efforts circumstances for as many as 100 million inhabitants by 2020 (United Nations, 2000), further underlining the international call to ameliorate and usurp food security deviations globally. As initially introduced, if the intensification of the global population progresses, this trend is projected to surpass Earth's carrying capacity and may correspondingly portend future worldwide food securities (Euromonitor, 2013; Wilson, 2012), if unabated.

MARKET DENSITY

Market density as defined in this paper is the traditional sense of density, whereas a quantitative measure of distribution within a finite spatial consideration. Market density therefore correspondingly calls to the availability and geographical accessibility of large discount distributors or traditional grocer retailer within each municipality of Bogotá, Colombia. A 2009 study led by Seliske investigated country-specific determinants such as availability of markets and food merchants, and exposed a converse relationship of weight in Canadian children 6-10 years of age to market accessibility (Seliske, Pickett, Boyce, & Jansen, 2009).

A United States-piloted, nationwide study examined supermarket chain density within a particular school zip code and first assumed comparable outcomes implicating the antithetical relationships of weight distribution in children aged 13-16 years of age (Powell, Auld, Chaloupka, O'Malley, & Johnston, 2007). This study (Powell et al., 2007), further underscored the importance to cognize various saturation effects of markets in food secure neighborhoods and contrariwise communities. It was also previously suggested that age and gender-dependent BMI variations were inversely associated to the permeation of supermarkets in the United States, demonstrating both the utility and application of geospatial analysis in elucidating market densities and availability of end-user access (Powell & Bao, 2009) to relative communal food procurement.

Market dynamics vary considerably concerning the rural poor and the urban poor (Jagannathan, 1987; Khan, 2013). To consider Alfred Marshall's (1890) model of raising bread price and corresponding consumer behavior, Marshall discovered that individuals:

> "…are forced to limit their consumption of meat and the more expensive farinaceous foods: and, bread being still the cheapest food which they can eat and will take, they consume more, and not less of it."

This relationship creates a Giffen good, which outlines the *violation* of the law of demand: such that as a commodity price increases, quantity of demand decreases (Sharp, Register, & Grimes, 2010). Whereas in the case of demand curves, *Px* is a function of *Qx*, and *Qx* remains the magnitude of demand:

$$Q_x = f(P_x)$$

In the context of Giffen goods, the consumption of inferior goods increase as costs increase (Marshall, 1890).

Currently, there is no appreciative tax liability upon basic goods in Colombia (Ministerio de Hacienda y Crédito Público [MINHCP], 2013). The absence of a basic goods tax is a benevolent policy directive by the Colombian Ministry of Finance and Public Credit to consumers of basic goods, benefitting the most vulnerable to food security disruptions. The basic goods considered exempt are tomatoes, potatoes, carrots, sprouts, grapes, apples, melon, seeds, bread, water, salt, cheese, milk, meat, fish, eggs, and live animals such as bovine, porcine, and caprine species (KPMG, 2012). This policy favors both the market, and the consumer base – which in the paradigm of the food insecure, represents those who are the most at-risk or susceptible as they characteristically demonstrate the most limited purchasing power. Markets

benefit from this strategy as they are able to contest and exchange more goods secondary to the fresh precipitation of gained purchasing power of consumers, encouraging sustained market consumption of basic food goods, and the overall stabilization of local and regional markets, arranging economies towards a generalized equilibrium.

CHAPTER THREE

METHODOLOGY

The principal objective of this study was to elucidate how market density impacts the food security status among the inhabitants across the twenty boroughs of Bogotá, Colombia. Globally, childhood obesity has increased over the recent decades to be considered a severe public health concern (World Health Organization, 2004) and market density studies have previously revealed strong correlations of poor sustenance procurement leading to both childhood obesity (Powell et al., 2007) and child hunger (Blanchard & Matthews, 2007); here, it was contrived to appraise the roles of the latter.

PARTICIPANTS

Hitherto analyses, the University of Central Oklahoma Institutional Review Board (Appendix A) granted de facto approval and unanimous exemption for the exploration of this study. All food security-sourced datasets were collected in aggregate, and this analysis did not incorporate any animate study participants.

INSTRUMENTATION

Instruments included validated (Carmago et al., 2012; Hackett, Melgar-Quinonez, & Uribe, 2008) food security statuses gathered by the Colombian Ministry of Health and the Universidad de los Andes and the social schema Bogotá Sin Hambre (Bogotá Without Hunger) programming (Integración Social, 2012). This data was then jointed to market distribution determined via market loci research then coupled to geospatial informatics (ESRI ArcGIS) and market intelligence (Euromonitor International, 2014) obtained from London-based Euromonitor International, a global intelligence firm, which provided information through industry, trade, and stratified market research and risk analysis.

PROCEDURES

Food security datasets were analyzed to describe the food securities of the 20 localities of Bogotá, Colombia, and were correlated with supermarket distribution to reveal trends in saturation. The food security datasets were established within published literature and governmental reports that described the varying degrees of supplemental markers to public safety and health detrimental to Bogotá, i.e. homicides, dispossession, insolvency, and food insecurities throughout the various localities and neighborhoods of Bogotá (Integración Social, 2012). Collectively, these reports are an arrangement of academic, non-governmental (NGO), and governmental organizations / institutions for the monitoring and observation of societal stressors, to which are evaluated. None of the aforementioned reports utilized any singular identifying datum, nor features that could possibly exploit or expose any individual.

To reveal the top three super / hypermarket chains (companies) of Bogotá, spreadsheets were generated to align data to the report, “Passport: Grocery Retailers in Colombia” produced by Euromonitor International (Euromonitor, 2014), a benchmark in economic intelligence. This dataset provided quantitative markers to market-specific *Passport* documents that are commonly used in both international regulatory speculations by both governments and private sector investments. These three companies were then extrapolated for their constituent top six brands. Supplemental Euromonitor reports were acquired pro re nata, and referenced respectively.

The following Bogotá localities were arranged by a declining proportion of poverty (Núñez & Cuesta, 2007) and were positioned to be analyzed in market dynamics: Usme, San Cristobal, Ciudad Bolívar, Bosa, Sante Fé, Rafael Uribe, Candelaria, Tunjuelito, Mártires, Kennedy, Antonio Nariño, Fontibón, Suba, Engativá, Barrios Unidos, Puente Aranda, Usaquén, Chapinero, and Teusaquillo.

A spreadsheet was then created of all grocery store locations given by this analysis and was plotted into point layers with ArcGIS, a cartographic software suite in geospatial intelligence. This transcends the capacity to ascertain distribution trends along the shape layers of Bogotá, aliquoting each point into their respective Cartesian forms. These layer forms were intended to produce heat maps, to display various levels of food securities, insolvency, hunger, and crime.

A finalized report was then extrapolated and challenged statistically to afford various indications to whether the aforementioned treatments can reliably infer and stand against a series of downstream interrogatories.

STATISTICAL ANALYSIS

For all inquires, the IBM-based benchmark *Statistical Package for the Social Sciences* (SPSS) was pragmatically applied to accomplish all the quantitative analysis of the study. Descriptive statistics was implemented to measure central tendencies, which included the arithmetic mean, mode, and median, skewness $\{\Sigma (Z^3/N)\}$, kurtosis $\{\Sigma (Z^4/N) - 3.0\}$, and to probe for normality and reveal possible contamination within various datasets. Ingression of data was examined through spreadsheet analysis and various programming macros to seek outliers, and to provide quality control during human computational interface.

Following exploration with descriptive statistics, a correlation analysis was performed bivariately that served in calculating Pearson's product-moment correlation coefficient $\{r = \Sigma (Zx\ Zy) / N\}$, a durable dimension of bilateral strength of two variables in a linear relationship.

CHAPTER FOUR

RESULTS

The primary purpose of this exploration was to ascertain if market density either frustrates or fortifies food securities in Bogotá, Colombia. Multiple considerations were thus assumed such as population dynamics and scrutinizing the relationships of each level of food security to its respective set. Bogotá population metrics were partitioned by locality and are described in Table 1, with a corresponding histogram of distribution shown in Figure 1. Food insecurity metrics of each locality has been described in Table 2, with a corresponding histogram in Figure 2. Likewise, mean population and mean food insecurity per centum by locality is displayed in Table 3, with corresponding mean population and mean food insecurity per centum dual axes histogram by locality is shown in Figure 3. Table 4 displays market distribution, which is arithmetically appropriated by retailer and corresponding brand, fixed with respective summation values by locality; Figure 4 correspondingly displays a histogram of mean market distribution by locality.

SECURITIES

As the primary objective of this study was to determine what burden market density places upon the food insecure, it was besought to pragmatically explore the singular associations of each constituents of set, (food insecurity). Below, the varying degrees of reported food securities:

i. Secure
ii. Mild Insecurity
iii. Moderate Insecurity
iv. Severe Insecurity

It was then assumed that a relationship between the summation of food insecurities shall coincide such that the total food insecurities will apt most suggestively with mild insecurities, in a manner to which, proportions who are mildly food insecure are greater than the moderately food insecure and the severely food insecure; consequently, severe food insecurities are anticipated to be less than moderate food insecurities, and mild food insecurities. Table 5 displays the per centum mild, moderate, and severe food insecurities by locality.

To validate that the means of each constituent of food insecurity are significantly different, a one factor repeated measure design analysis of variance was calculated comparing food insecurity at three different levels: mild, moderate, and severe. A significant effect was found (F (1.024, 19.457) = 24.347, $p < 0.001$). Further, all pairwise comparisons were significantly different, $p < 0.001$. Table 6 displays the results of this one-factor analysis of variance and least significant difference multiple comparison test.

To establish the relationship of mild food insecurity and food insecurity, a Pearson's correlation coefficient then revealed a strong positive correlation ($\alpha = 0.001$) that was significant (r (18) = 0.972, $p < 0.001$). Table 7 displays the results of this correlation by sample; Figure 5 displays the scatterplot.

To establish the relationship of moderate food insecurity and food insecurity, a Pearson's correlation coefficient then revealed a strong positive correlation ($\alpha = 0.001$) that was significant (r (18) = 0.959, $p < 0.001$). Table 8 displays the results of this correlation by sample; Figure 6 exhibits the scatterplot.

Finally, to establish the relationship between severe food insecurity and food insecurity, a Pearson's correlation coefficient revealed a strong positive correlation ($\alpha =$

0.05), which was significant (r (18) = 0.801, $p < 0.001$). Table 9 displays the results of this correlation by sample; Figure 7 displays the scatterplot.

Consequently, it was ascertained that food insecurity is proportionally distributed throughout the strata of food insecurities, with uniform decay from mild, moderate, to the severe rostra of insecurities. Descriptive statistics for all levels of food securities by locality is displayed in Table 10. Analogously, a dual axes histogram coupling mean population and mean per centum mild food insecurities by locality is shown on Figure 8. A dual axes histogram coupling mean population and mean per centum moderate food insecurities by locality is shown on Figure 9. Lastly, a dual axes histogram coupling mean population and mean per centum severe food insecurities by locality is shown on Figure 10.

FOOD INSECURITIES & MARKET DENSITY

To challenge the potential relationship between food insecurity and market density, a series of analysis involving descriptive statistics is shown in Table 10 and bivariate correlation analyses were conducted. To address the aforementioned affiliation, a null hypothesis was formed: Food insecurity is not related to market distribution.

A two-tailed α was then set to 0.05, and a Pearson's correlation coefficient was then calculated to establish the relationship between food insecurities and market distribution. This analysis revealed a moderate, negative correlation, which was significant (r (18) = -0.531, p = 0.016, directing the rejection of the null hypothesis and consequently accepting the alternative hypothesis as food insecurities remain correlated with market distribution. Table 11 displays the results of the correlation by sample; Figure 11 displays the scatterplot. Table 12 displays the market distribution per centum food insecurity by locality; Figure 12 displays a dual axes histogram coupling mean market distribution and mean per centum food

insecurities by locality. Table 13 presents the physical market locus throughout all localities, ad tempus.

Following the rejection of the null hypothesis, it was then presumed that an antithetical association between food security and market distribution existed and was consequently discovered to have a moderate positive relationship (r (18) = 0.531, p = 0.016), confirming a significant relationship between the two corresponding variables (food security, market density). Table 14 displays the results of this correlation; Figure 13 displays the scatterplot.

INSOLVENCY

To examine the association of the food insecure and the insolvent, a baseline expression was established {food insecurity ● locality^{-1}: insolvency ● locality^{-1}}, then a Pearson's correlation coefficient was computed which indicated a strong positive correlation which was significant (r (17) = 0.957, p < 0.001). A regression equation was formed [(insolvency') = -833.048 + 0.697 (food insecurity)] and a regression analysis then revealed (F (1, 18) = 196.257, p < 0.001) with an R^2_{α} = 0.911. Table 15 displays the results of this variance by sample; Figure 14 displays the scatterplot.

To understand the relationship between the insolvent (ω) and the saturation of markets, a simple regression equation was calculated [(insolvency') = 8964.27 – 0.634 (market density)]. It was found that a significant regression was produced (F (1, 18) = 81.843, p < 0.001), with an R^2_{α} = 0.810. Table 16 displays the results of this regression by sample; Figure 15 exhibits the scatterplot.

POPULATION DENSITY

To characterize the association of population density and the density of the food insecure, a Pearson correlation coefficient was calculated. Here, a strong positive significant correlation (r (18) = 0.888, $p < 0.001$) was found, confirming a relationship between the population density of each locality and that of the parallel density of the food insecure throughout Bogotá. Table 17 displays the results of the correlation by sample; Figure 16 displays the scatterplot. A simple regression equation was then postulated that [(population density`) = 389.026 + 2.859 (food insecure density)]. It was then found that a significant regression was produced (F = (1, 18) 67.823, $p < 0.001$), with an $R^2_{\alpha =}$ 0.777. Table 18 displays the results of the regression analysis.

CHAPTER FIVE

DISCUSSION

The primary purpose of this study was to ascertain if market density either frustrates or fortifies food securities for persons in Bogotá, Colombia. Previous studies suggest dynamic market sensitivities that diverge significantly concerning the insolvent, and those who remain food insecure (Khan, 2013). It was also formerly proposed that age and gender-dependent BMI variations were inversely related to market saturation in the United States, which revealed antagonistic outcomes regarding end-user access and combined shared food procurement (Powell & Bao, 2009).

By utilizing Colombia as an archetype, we are provided a unique perspective into a food insecure milieu in a country that is paradoxically abundant in agronomy, possesses a stabilized economy, and yet, sieved with a prolonged internal conflict which continues to violently disrupt, translocate, and alter the lives of citizens athwart Colombia. Here, it was determined that market distribution has a significant effect on the capacity for individuals to procure foods to satisfy their requisite needs as defined by the World Bank (1986). Market distribution was predicted to influence food security in a variety of ways:

1. It was predicted that as market distribution increased, food insecurities would likewise decrease
2. It was also predicted that this distribution would lend inversely, where in the case of reduced market distribution, food securities decreased linearly

It is prudent to assume and underscore that any suggestive correlation between any aforementioned variables does not ascertain causation, but virtuously ascertains a non-chance relationship between two variables. This exploration examined a stratified sample of total markets by identifying the top three super / hypermarket companies, extrapolating their respective six brands that coincide throughout the twenty localities of Bogotá, Colombia. These six brands were then explored to reveal the trends and interactions of both marketplace allocation and food insecurities.

As the protracted civil war still lingers throughout Colombia, the effigies of lingering and persistent perils of terrorism will be long-endured throughout the metropolises as the guerrilla insurgency features multiple fronts, triggering countrywide human translocation to the city slums. These displaced are often the most vulnerable for numerous wearisome scenarios, and are regularly subjugated by the disparaging attitudes and social perceptions concerning the displaced and the impoverished, which promote and magnify intraneighborhood violence, slum geographies, and the broad-spectrum lack of infrastructure to receive these victims.

FUTURE RESEARCH

Fortified with this data, it is imperative to challenge forthcoming studies and abound in exploration to further confirm these findings with other food insecure environments that are also espoused with violence. Other assorted public health indicators such as measuring population dynamics of the impoverished, dispossessed, and correlating civil safety trends were considered and posed interesting questions regarding future studies once coupled with market density and food securities. By identifying potential socioeconomic barriers, and through the focused convalescence of such, communities enduring food insecurities are in better position to reduce hunger, increase the quality of life, and progress both the human and social capital. Through

careful measurements of both programming outcomes (appraisal of initial effects of programming) and the long-term effects (or impacts), organizations are postured with various modalities to a myriad of social disruptions.

Currently, explorations are underway to support the role of micronutrient supplementation efforts in traditional food retailers' with nontraditional food distribution points. These efforts can be best orchestrated with respective community leaders representing those most at need with representatives from various altruistic institutions such as NGOs and multinational corporations postured in benevolence. It remains noteworthy to determine how these modalities can position themselves in a future where food exhaustion is becoming a growing concern. Innovative measures such as hydroponics, container gardens, and microagronomy may become the community-based remedy to local food insecurities.

Communal efforts such as altruistic commons, public green-spaces, and community gardens may become a tie that festoons community trust and public unification. Millions of Colombians subsist at the greatest levels of risk and marginalization (Fadnes & Horst, 2010), and the internally displaced are further compounded by depoliticization existing communal bias and prejudice. The internal conflict symptomatically compels victims near the very precipice of destitution and dispossession and neocommunity ostracization tends to exacerbate and inhibit social development and thereby contracts growth (Ibañez & Vélez, 2007). This capital stunting is not isolated to the social capital of a community or society at a macro level, but also the human capital of individuals, driving a larger rift into their own competence for self-realization or conditional amelioration. These communal microaggressions traditionally aggravate and destroy the capital potential of society.

Communal disarray functions as an antecedent to the communal violence throughout

Bogotá, where both children and adults (Rizzini, & Lusk, 1995) seemingly partake into illegal activity impartially for financial reasons, but for also for inclusion, security, and protection. Therefore, the allurement to resolving insolvency must be recognized as its own virtuous campaign, with preconditions to provide parallel resources to evaluate the rehabilitative process of the victims of displacement and other social outcomes of the internal conflict. Various community strategy reforms must adapt for the convalescence of these conditions vis-à-vis the mounting insolvency of the urban poor and those that stymie development.

Comparable with most of Latin America, Colombia is nonetheless fraught to develop into a highly-industrialized nation state; however, the economic future remains highly auspicious as both regional and international trade, finance, and investments are coalescing into a malleable institution for a stabilized national economy. Through the ongoing augmentation of novel economic devices such as free trade agreements, Colombia remains positioned to penetrate into innovative markets, which will lead to an increase of exported goods at favorably tariffed rates, preserving imports with fair duty standards, and ultimately reaching the goal of economic development by achieving Colombia's immense national growth potential.

Thus the diffident national economy of Colombia can be described as a function of a myriad of reforms, and the direct product of increased fiscal discipline, increased concentration of public expenditure in public goods (i.e. transportation, infrastructure, education etc.), tax reforms, competitive exchange rates, trade liberalization, encouraging foreign direct investments, and the deregulation of policies that had previously blocked permeation into new markets or those that restricted competition between players or

multinational corporations. In addition, the prudential oversight of financial institutions has helped seed and harvest the fiscal trust obligatory for sustained economic growth through both responsibility and transparency.

A particular distinction between the rural poor and their urban compatriots is that often members of a rural community (or individual households) have a higher frequency to potentially satisfy their access to food secondary to what the author describes as an occupation proximity effect. This occupation proximity effect is defined as a linear consequence (or direct yield of basic goods) from vocational arrangements or diurnal activities associated with occupations such as (and not limited to) ranching, farming, etc. Such in the circumstance of Colombia, a nation state richly endowed with natural resources and agronomy, is afforded a reduced demand to import basic food goods in support of (or to sustain) its citizens. This ironic profusion of flora is often sufficient to supplement the rural poor while the urban poor do not have the same proximity access to these same basic food goods. For the urban poor will have to invest more for not only the food goods, but also the corresponding taxes (with the exception of basic goods – milk, eggs, bread, etc.; KPMG, 2012), and the assorted appreciations due to the added distribution and logistic expenditures of goods to markets scenarios (a transfer of costs to consumers).

These appreciative costs may regularly include personal or mass transportation to the marketplace, counterpoising or increasing fuel or public transit expenses. A unique credence to consider of the urban poor is although the majority is deprived a form personal transportation such as a personally-owned vehicle (or maintains limited access to such an asset), some are further disadvantaged by the deprivation or inaccess to public transit, and consequently must spend more valuable calories to reach their particular terminus or market. As the incremental

transfer of costs reaches the consumer, this escalation of expenses for various goods compounds the individual lost purchasing power that contributed to the food insecurity hencetofore.

By considering calories as a renewable resource, corporeal logistics and related individual behaviors become a unique and direct challenge to the surplus of calories whilst attempting to both preserve and accumulate this resource. This deepens an unseen chasm as the food insecure or hungry must now consume more calories to offset the caloric deficit prompted by the physiological burden of physical exertion, laborious activities, or the quotidian orbital loop of logistics to and from the market coupled with an auxiliary consignment of fare. This logistic load burden or logistic modulus increases, magnifies, expands, and extends poverty traps by both maintaining and encouraging biological stress whilst increasing the physiological requirement for calories.

This inability or failure of achieving a significant calorie surplus exacerbates the functional requirement for work, which can lead to other variable-based poverty traps (Banerjee & Duflo, 2011). Therefore improving caloric surpluses can have a concealed snare that is grounded in various environmental or infrastructure-based variables. One trap can be elucidated by examining the relationship of caloric need, or acquisition, without aggregating a great degree of a logistic liability as an opportunity cost. This opportunity cost ultimately leads to diminishing returns on caloric investment. One of the antithetical associations between the urban and rural poor prevalently assails many developing or less-developed countries, though provides the urban poor with greater access to education, healthcare, and technologies, while their rural counterparts may classically have a continuity of food access, due to the aforementioned occupation proximity effect.

CONCLUSION

Food insecurity is earmarked by the distribution of markets, and amid degrees that demonstrated the highest intensity of market saturation, characteristically determined greater alimentary securities for the respective denizens. Though this trend strengthens the impression that it is imperative to establish greater market penetration into the slums – or areas of concentrated insolvency and dearth, this penetration is not deprived of its own particular set of caveats, particularly those surrounding stability, safety, and disruptions to the localized informal economies. Nonetheless, through erstwhile public efforts that preserve and optimistically alter social mechanisms, societal norms can be shifted to favor increased altruistic behavior that enhances community stability and fortitude. These essential efforts will assist in the future facilitation of efficacious market permeation, a task that is not an impervious reality if it can overcome its own imprudent limitations and liabilities.

In Colombia, the maturing (geriatric) population is likewise a passively marginalized, food insecure milieu that exists in the opposite brim of the population bell curve. By affording upgraded and improved infrastructure to these slum communities, it is anticipated that greater individual and public health needs will be met by subsidized governmental programming. Among increased social securities such as disease prevention and intervention, other efforts can be further achieved as nutritional indices are improved with the robust infrastructure. Medellín, the second largest megalopolis of Colombia (CIA, 2014), provided their comuna residents with cable cars so that their most vulnerable populations had greater physical access to markets, employment, and schools (Fukuyama & Colby, 2011). These social initiatives have proven to increase public safety and help unify the insolvent community with the mainstream populations.

As in Bogotá, comunas tend to drape the upper extent of the mountains, making difficult the capacity for the elderly to travel by foot. The cable cars of Medellín (Medellín Metrocable) demonstrate how constructive policy transitions can favor both the vulnerable populations but also the social development of an entire metropolis. Various civic investments such as these gondola cars have also facilitated the expulsion of violent paramilitaries that plagued the comunas with fear and brutality (Fukuyama, & Colby, 2011) in Medellín.

Another social investment was completed in 2007 within the comuna Santo Domingo, as the King of Spain commissioned an avant-garde biblioteca (Castro & Echeverri, 2011), resembling three obsidian sarsenesque obelisks that currently hawks Medellín along a cliff face of Santo Domingo. Parque Biblioteca España stands alone as an inordinate institution of renowned community pride for the residents of the slum Santo Domingo. This comuna, once considered one of the most dangerous of all of Latin America (Fukuyama & Colby, 2011), now stands as a prominent physical feature that represents the interface for technology, education, and arts – coalescing and integrating human capital from traditional communities with those of the comunas.

By increasing market permeation whilst attempting to limit pecuniary disruptions to the informal markets and economies will positively impact the sustenance difficulties for those in these zones (though it is not anticipated to unilaterally provide the panacea to the inclusively compound condition of food insecurity). Particularly in Ciudad Bolívar, and likewise with other comunas that swathe the upper extents of the Andean landscape, these zones have extraordinary human capital potential secondary to the concentration of youth populations that dwell within these spaces. It is imperative to propose innovative strategies to

improve other insecurities (healthcare, education, etc.) in these relegated extents, and to provide the emergent population the necessary development-based modalities such as nutrition and education access, positioning recipients more favorably for future achievements. For with basic nutritional needs being met, they are more apt to traverse to school, to gain a meaningful education, and stand equipped for the future.

Secondary economics that cascade following infrastructure changes are optimistic as augmented capital (human) attainment promotes a decrease in unemployment, promotes social spending, which stabilizes local economies and functions as markers for economic development. Conceivable market caveats include microtienda exposure, which provides communities with microcredit as it unilaterally approaches the function of a microeconomy for various consumer behaviors, particularly for those most vulnerable. In these instances, it is not uncommon for members of a community to go into their local microtienda, and receive a “fiar” or a loaned basic good, customarily a customer guarantee without collateral.

These basic goods are customarily inferior basic goods, which are fundamentally unfavored to superior goods. Common items are usually a one-dose supply of detergent, a teaspoon of salt, or half stick of butter. These basic goods are usually paid back to the store owner within a short period of time, usually within a span of few days. These microeconomies are not predicted to endure delimited disturbances by the market infiltration of traditional grocer retailers, as the consumer behavior in these destitute bands are vastly different than traditional consumer behavior.

In traditional consumer behavior, consumers generally purchase basic goods dichotomously by either satisfying proximate needs by purchasing basic goods, or by satisfying future needs by purchasing goods that are intended to last greater than a week. The

first decision is typically satisfied by the procurement of basic goods at a large discount retailer. The second choice is characteristically satisfied by purchasing basic goods at a large warehouse distributor, which provides enhanced savings per unit, as most basic goods are regularly bundled in bulk or in greater quantities than that of the large discount retailer, or traditional grocer retailer. Examples of the first decision includes a loaf of bread and gallon milk from the traditional grocer retailer, or large discount distributor. These basic goods are intended to last greater than one day, but less than or equal to, one week. The second option could often be met with multiple loaves of bread, and multiple gallons of milk; correspondingly, items intended to last a duration of greater than one week.

Consumer behaviors of vulnerable populations residing within insolvent communities or comunas frequently purchase their items from the smaller and more reachable tienda or microtienda, and are regularly incapable to traverse to the traditional discount distributor. Therefore, the mechanisms of behavior can be cast by two similar but wholly diverse measures, by satisfying proximate needs by purchasing basic goods, and by satisfying instant needs by purchasing basic goods indecorum.

The first decision is met by purchasing basic goods for the day, under the concept that these basic goods may be consumed or utilized for more than a day. The second choice is satisfied by purchasing basic goods indecorum, or for satisfying immediate needs. Accordingly, a consumer needing a teaspoon of honey, or scoop of rice (prepared or not) may acquire such basic goods for immediate or instant consumption. Parenthetically, this particular choice is the most apropos vis-à-vis of slum microeconomics, and for those representatives of the highest stratum of facultative need, or hunger.

As supply and demand forecasts, price is a function of quantity and demand of a good (Sharp, Register, & Grimes, 2010). Recall that as commodity prices climb, the magnitude of demand declines proportionally. Therefore, the financial encumbrance is significantly greater for the urban poor consumer purchasing basic goods at an aliquoted partition within microtiendas. Though these aliquots most certainly satisfy consumer demands indecorum, it possesses an *accumulative pecuniary effect*, or financial penalty, as it characteristically overburdens the consumer with local price per unity parity unaccustomed in other thriving local markets. Successful market permeation can therefore theoretically assuage this condition by adapting to consumer demands for basic goods at a discounted rate, a universally applied modus operandi in most contemporary discount grocery distributor pricing schemata, nevertheless satisfying the portentous needs of immediate, proximate, and future needs of the respective consumer base.

Correspondingly, it is the position of the researcher that market penetration into the comunas augmented with effective infrastructure expansion, can provide an evocative epione necessary for social remediation and human capital development. Yet, the researcher abjures the myopic perception that market distribution (per ipsum) spawns food insecurities, as it is dutifully stressed that this marker is only validated once corroborated as a supplemental apparatus to detect susceptivity to various sustenance anxieties.

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Tables

Table 1.

Population by locality

Locality (λ)	Pop
Usaquén	474,773
Chapinero	133,778
Santa Fé	109,993
San Cristóbal	409,799
Usme	382,876
Tunjuelito	201,843
Bosa	583,056
Kennedy	1,019,949
Fontibón	345,909
Engativá	843,722
Suba	1,069,114
Barrios Unidos	233,781
Teusaquillo	146,583
Los Mártires	97,926
Antonio Nariño	108,307
Puente Aranda	258,441
La Candelaria	24,144
Rafael Uribe Uribe	377,615
Ciudad Bolívar	639,937
Sumapaz	6,258

Table 2.

Food insecurity by locality

Locality	Food Ins
Usaquén	58,397
Chapinero	14,314
Santa Fé	39,158
San Cristóbal	156,543
Usme	154,682
Tunjuelito	45,213
Bosa	230,307
Kennedy	230,508
Fontibón	42,547
Engativá	153,557
Suba	215,961
Barrios Unidos	42,081
Teusaquillo	12,606
Los Mártires	26,930
Antonio Nariño	27,727
Puente Aranda	56,082
La Candelaria	6,905
Rafael Uribe Uribe	124,613
Ciudad Bolívar	229,097
Sumapaz	3,423

Table 3.

Population and per centum food insecurity by locality

Locality	Population	Food Insec (%)
Usaquén	474,773	12.3
Chapinero	133,778	10.7
Santa Fé	109,993	35.6
San Cristóbal	409,799	38.2
Usme	382,876	40.4
Tunjuelito	201,843	22.4
Bosa	583,056	39.5
Kennedy	1,019,949	22.6
Fontibón	345,909	12.3
Engativá	843,722	18.2
Suba	1,069,114	20.2
Barrios Unidos	233,781	18
Teusaquillo	146,583	8.6
Los Mártires	97,926	27.5
Antonio Nariño	108,307	25.6
Puente Aranda	258,441	21.7
La Candelaria	24,144	28.6
Rafael Uribe Uribe	377,615	33
Ciudad Bolívar	639,937	35.8
Sumapaz	6,258	54.7

Table 4.

Market distribution by locality

Locality	Food Insec (%)	Exito	Surtimax	Olimpica	Metro	Carulla	Jumbo
Usaquén	12.3	3	2	7	0	4	1
Chapinero	10.7	4	1	9	0	12	0
Santa Fé	35.6	3	2	4	0	0	0
San Cristóbal	38.2	1	0	1	0	0	0
Usme	40.4	2	0	0	0	0	0
Tunjuelito	22.4	1	1	3	0	0	0
Bosa	39.5	0	2	0	1	0	0
Kennedy	22.6	4	0	0	2	0	0
Fontibón	12.3	2	2	0	1	0	1
Engativá	18.2	1	2	2	1	1	0
Suba	20.2	0	7	6	0	5	6
Barrios Unidos	18	1	1	3	1	1	0
Teusaquillo	8.6	0	0	1	0	1	0
Los Mártires	27.5	0	0	2	0	0	0
Antonio Nariño	25.6	2	1	1	0	0	0
Puente Aranda	21.7	2	1	1	1	0	1
La Candelaria	28.6	2	0	1	0	0	0
Rafael Uribe	33	1	1	0	1	0	0
Ciudad Bolívar	35.8	0	0	2	0	0	0
Sumapaz	54.7	0	0	0	0	0	0

Table 5.

Food insecurities by locality

Locality	Food Insec (%)	Mild (%)	Mod (%)	Sev (%)
Usaquén	8.4	3.7	0.2	12.3
Chapinero	7.7	2.3	0.7	10.7
Santa Fé	24.1	9	2.5	35.6
San Cristóbal	29.7	7.1	1.4	38.2
Usme	29.7	9.4	1.3	40.4
Tunjuelito	17.5	4.7	0.2	22.4
Bosa	26.9	10.2	2.4	39.5
Kennedy	17.6	4	1	22.6
Fontibón	10.3	2	0	12.3
Engativá	15.8	2.4	0	18.2
Suba	15	4.3	0.9	20.2
Barrios Unidos	13.7	3.8	0.5	18
Teusaquillo	6.3	2.3	0	8.6
Los Mártires	17.8	7.7	2	27.5
Antonio Nariño	19.4	5	1.2	25.6
Puente Aranda	18.5	2.4	0.8	21.7
La Candelaria	18.8	8.4	1.4	28.6
Rafael Uribe Uribe	21.7	9.4	1.9	33
Ciudad Bolívar	26.8	8.5	0.5	35.8
Sumapaz	47.8	6.5	0.4	54.7

Table 6.
One way ANOVA / LSD

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Insecurity	Sphericity Assumed	48213919201	2	24106959601	24.347	0
	Greenhouse-Geisser	48213919201	1.024	47081858328	24.347	0

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
Insecurity	0.047	55.052	2	0

Pairwise Comparisons

(I) Insecurity	(J) Insecurity	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	49966.171*	10275.4	0	28459.537	71472.81
	3	66739.286*	13388.5	0	38716.91	94761.66
	3	16773.115*	3494.7	0	9458.673	24087.56

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 7.

Pearson's correlations of mild insecurity and insecurity

Variable	*N*	*r*
Food insecurity	20	
Mod Food Insec	20	0.994**

**Indicates significance level < 0.001

Table 8.

Pearson's correlations of moderate insecurity and insecurity

Variable	*N*	*r*
Food insecurity	20	
Mod Food Insec	20	0.959**

**Indicates significance level < 0.001

Table 9.

Pearson's correlations of severe insecurity and insecurity

Variable	*N*	*r*
Food insecurity	20	
Sev Food Insec	20	0.801**

**Indicates significance level < 0.001

Table 10.

Summary Statistics (N=20)

		Mean	Std Dev	Range
Food Insecurities	Secure	279846.81	246029.971	2828.68 – 853152.97
	Mild	70079.335	62849.227	2291.32 – 179511.02
	Moderate	20113.166	18873.184	406.77 – 59471.71
	Severe	3340.05	4035.994	0.00 – 13993.34
Market Density		6.8	7.223	0.00 – 26.000
Insolvency		64399.05	61083.79	0.00 – 206198.000
Population Density		372562.1	31633.76	0.00 – 1068932.00

Table 11.

Pearson's correlation of market distribution and food insecurity

Variable	*N*	*r*
Food Insecurity	20	
Market Distribution	20	0.531*

*Indicates significance level < 0.05

Table 12.

Market distribution and food insecurity

Locality (λ)	Φ (%)	Exito	Surtimax	Olimpica	Metro	Carulla	Jumbo
Usaquén	12.3	3	2	7	0	4	1
Chapinero	10.7	4	1	9	0	12	0
Santa Fé	35.6	3	2	4	0	0	0
San Cristóbal	38.2	1	0	1	0	0	0
Usme	40.4	2	0	0	0	0	0
Tunjuelito	22.4	1	1	3	0	0	0
Bosa	39.5	0	2	0	1	0	0
Kennedy	22.6	4	0	0	2	0	0
Fontibón	12.3	2	2	0	1	0	1
Engativá	18.2	1	2	2	1	1	0
Suba	20.2	0	7	6	0	5	6
Barrios Unidos	18	1	1	3	1	1	0
Teusaquillo	8.6	0	0	1	0	1	0
Los Mártires	27.5	0	0	2	0	0	0
Antonio Nariño	25.6	2	1	1	0	0	0
Puente Aranda	21.7	2	1	1	1	0	1
La Candelaria	28.6	2	0	1	0	0	0
Rafael Uribe	33	1	1	0	1	0	0
Ciudad Bolívar	35.8	0	0	2	0	0	0
Sumapaz	54.7	0	0	0	0	0	0

Φ% = % Food insecure

Table 13.

Market Location by locality

Address	Format	Locality (λ)
Carrera 10 Nº 11-34 Sur	Supermarket Olimpica	Antonio Nariño
Transversal 24B Nº 14A-51	Surtimax	Antonio Nariño
Carrera 13 Nº 16-48 Sur	Éxito	Antonio Nariño
Carrera 20 Nº 14-17 Sur	Éxito	Antonio Nariño
Calle 100 Nº 30-74	Supermarket Olimpica	Barrios Unidos
Calle 69 Nº 44-20	Supermarket Olimpica	Barrios Unidos
Carrera 38 Nº 97-76 Local 102	Supermarket Olimpica	Barrios Unidos
Carrera 94A Nº 98A-51	Metro	Barrios Unidos
Ave Rojas Nº 71-19	Surtimax	Barrios Unidos
Ave Carrera 68 Nº 90-88	Éxito	Barrios Unidos
Transversal Nº 24 83-39	Carulla	Barrios Unidos
Calle 57Sur Nº 77A-18	Metro	Bosa
Carrera 92 Nº 60-90 Sur	Metro	Bosa
Carrera 86 Nº 55A-20	Surtimax	Bosa
Carrera 4 Nº 18-42	Supermarket Olimpica	Candelaria
Carrera 7 Nº 11-30	Éxito	Candelaria
Carrera 5 Nº 13-50	Éxito	Candelaria
Carrera 7 Nº 82-82	Supermarket Olimpica	Chapinero
Calle 63 Nº 16-25	Supermarket Olimpica	Chapinero
Calle 97 Nº 10-45	Supermarket Olimpica	Chapinero
Carrera 15 Nº 97-25	Supermarket Olimpica	Chapinero
Carrera 13 Nº 56-59	Supermarket Olimpica	Chapinero

Carrera 24 Nº 63F-55 Esquina	Supermarket Olimpica	Chapinero
Calle 64 Nº 11-05	Supermarket Olimpica	Chapinero
Calle 72 Nº 13-85	Supermarket Olimpica	Chapinero
Calle 63A Nº16-55	Hypermarket Olimpica	Chapinero
Calle 35 Nº 71C-19	Surtimax	Chapinero
Carrera 15 Nº 51-45	Éxito	Chapinero
Calle 52 Nº 13-70	Éxito	Chapinero
Calle 65 Nº 78-54	Éxito	Chapinero
Ave Caracas Nº 71-60	Éxito	Chapinero
Carrera 24 Nº 41-43	Carulla	Chapinero
Calle 47 Nº 9-10	Carulla	Chapinero
Calle 53 Nº 26-60	Carulla	Chapinero
Calle 63 Nº 7-9	Carulla	Chapinero
Carrera 10A Nº 70-37	Carulla	Chapinero
Calle 72 Nº 13-85	Carulla	Chapinero
Carrera 77 Nº 8A-95	Carulla	Chapinero
Calle 85 Nº 9-67	Carulla	Chapinero
Calle 85 Nº 15-29	Carulla	Chapinero
Calle 92 Nº 15-34	Carulla	Chapinero
Carrera 11 Nº 90-49	Carulla	Chapinero
Calle 97 Nº 16-31	Carulla	Chapinero
Carrera 97C Nº 69A-08 Sur	Supermarket Olimpica	Ciudad Bolivar
Calle 35Sur Nº 80-35	Supermarket Olimpica	Ciudad Bolivar
Calle 68A Nº 90A-31	Surtimax	Engativa
Calle 80 Nº 89A-40	Surtimax	Engativa

Calle 68A Nº 90A-31	Supermarket Olimpica	Engativá
Calle 50 Nº 100-52	Hypermarket Olimpica	Engativá
Calle 46A Nº 85A-51	Metro	Engativá
Calle 35A Nº 73-02	Éxito	Engativá
Carrera 78K Nº 35B-00	Carulla	Engativá
Centro Comercial Hayuelos	Jumbo	Fontibon
Calle 17 Nº 112-58	Metro	Fontibon
Carrera 80G Nº 25-52	Surtimax	Fontibon
Carrera 99 Nº 25A-17	Surtimax	Fontibon
Carrera 75 Nº 23F-30	Éxito	Fontibon
Carrera 68B Nº 24-39	Éxito	Fontibon
Calle 6A Nº 78A-68 Sur	Metro	Kennedy
Calle 42A Sur Nº 86-15	Metro	Kennedy
Carrera 77 Nº 8A-95	Éxito	Kennedy
Ave Americas Nº 68A-94	Éxito	Kennedy
Carrera 78B Nº 35-48	Éxito	Kennedy
Carrera 78 Nº 37A-53 Sur	Éxito	Kennedy
Carrera 13 Nº 14-30	Supermarket Olimpica	Los Mártires
Calle 10 Nº 27-5 Centro Comercial	Supermarket Olimpica	Los Mártires
Carrera 40 Nº 22C-10 Corferias	Supermarket Olimpica	Puente Aranda
Carrera 32 Nº 17B-04	Jumbo	Puente Aranda
Ave 68 Nº 38-87	Metro	Puente Aranda
Calle 13 Nº 36-86	Surtimax	Puente Aranda
Autopista Sur Nº 38A Sur-07	Éxito	Puente Aranda
Ave Esperanza Nº 62-49	Éxito	Puente Aranda

Carrera 10 Nº 30B-20 Sur	Metro	Rafael Uribe
Diagonal 45S Nº 18-12	Surtimax	Rafael Uribe
Calle 27Sur Nº 26-24	Éxito	Rafael Uribe
Ave Jimenez Nº 4-74	Supermarket Olimpica	San Cristobal
Calle 21Sur Nº 5A-34	Éxito	San Cristobal
Ave 3 Nº 29-69	Supermarket Olimpica	Santafé
Calle 16 Nº 16-43	Supermarket Olimpica	Santafé
Carrera 10 Nº 23-66	Supermarket Olimpica	Santafé
Carrera 9 Nº 14 Esquina	Hypermarket Olimpica	Santafé
Carrera 5 Nº 7S-91	Surtimax	Santafé
Carrera 10 Nº 12-47	Surtimax	Santafé
Calle 1 Nº 10-08	Éxito	Santafé
Carrera 7 Nº 22-36	Éxito	Santafé
Carrera 7 Nº 32-84	Éxito	Santafé
Carrera 3 Nº 29A-02 Autopista Sur	Supermarket Olimpica	Soacha
Carrera 7 Nº 32-35	Metro	Soacha
Calle 11 Nº 11-05	Surtimax	Soacha
Calle 15 Nº 3A-18	Surtimax	Soacha
Ave Norte Nº 47A-4	Supermarket Olimpica	Suba
Calle 95 Nº 47A-09	Supermarket Olimpica	Suba
Carrera 58 Nº 137B-01 Portoalegre	Supermarket Olimpica	Suba
Carrera 58 N 169B-43	Supermarket Olimpica	Suba
Carrera 46 Nº 152-46	Supermarket Olimpica	Suba
Calle 140 Nº 91-19	Hypermarket Olimpica	Suba
Ave Calle 80 Nº 69Q-50	Jumbo	Suba

Centro Comercial Titán	Jumbo	Suba
Centro Comercial Bulevar Niza	Jumbo	Suba
Centro Comercial Suba	Jumbo	Suba
Calle 170	Jumbo	Suba
Centro Comercial Santafé	Jumbo	Suba
Diagonal 84A Nº 77-52	Surtimax	Suba
Calle 129A Nº 54A-09	Surtimax	Suba
Carrera 51A Nº 128A-50	Surtimax	Suba
Calle 139 Nº 112-26	Surtimax	Suba
Calle 140 Nº 92-30	Surtimax	Suba
Calle 129A Nº 54A-09	Surtimax	Suba
Carrera 51A Nº 128A-50	Surtimax	Suba
Carrera 52A Nº 170-75	Carulla	Suba
Carrera 53 Nº 102A-77	Carulla	Suba
Calle 114A Nº 45-78	Carulla	Suba
Calle 116 Nº 70F-43	Carulla	Suba
Ave Calle 127 Nº 60-26	Carulla	Suba
Ave Boyacá Nº 53 Esquina	Supermarket Olimpica	Teusaquillo
Carrera 50C Nº 53-50	Carulla	Teusaquillo
Carrera 74 Nº 38-10 Sur	Supermarket Olimpica	Tunjuelito
Diagonal 46 Sur Nº 51-52	Supermarket Olimpica	Tunjuelito
Transversal 64A Nº 26-50 Sur	Hypermarket Olimpica	Tunjuelito
Carrera 25 Nº 45S-59	Surtimax	Tunjuelito
Calle 47B Sur Nº 24B-33	Éxito	Tunjuelito
Calle 153 Nº 40-77	Supermarket Olimpica	Usaquen

Carrera 7 Nº 108-44	Supermarket Olimpica	Usaquen
Ave 19 Nº 137-138	Supermarket Olimpica	Usaquen
Autopista Norte Km 21 La Caro	Supermarket Olimpica	Usaquen
Calle 114 Nº 6-92 Local C-129	Supermarket Olimpica	Usaquen
Calle 140 Nº 23-61	Supermarket Olimpica	Usaquen
Carrera 7A Nº 139-04 Local 501	Supermarket Olimpica	Usaquen
Centro Comercial Santa Ana	Jumbo	Usaquen
Carrera 7D Nº 156-15	Surtimax	Usaquen
Calle 163A Nº 8G-08	Surtimax	Usaquen
Ave Boyacá, Carrera 72 Nº 146B	Éxito	Usaquen
Calle 134	Éxito	Usaquen
Centro Comercial Unicentro	Éxito	Usaquen
Calle 125Bis Nº 29-23	Carulla	Usaquen
Carrera 15 Nº 113A-33	Carulla	Usaquen
Calle 121 Nº 6-46	Carulla	Usaquen
Ave Calle 127 Nº 14-30	Carulla	Usaquen
Ave Carrera 1 Nº 65D-58 Sur	Éxito	Usme
Carrera 1A Nº 65Sur-58	Éxito	Usme

Table 14.

Pearson's correlation of market distribution and food security

Variable	*N*	*r*
Food Security	20	
Market Distributiuon	20	0.531*

* Indicates significance <0.05

Table 15.

Regression of food insecurity and insolvency

Variable	*N*	F	R^2	$R^2\alpha$	Sig
Insolvent	19				
Food Insecurity	19	196.257	0.916	0.911	0.000

Table 16.

Regression of market distribution and insolvency

Variable	*N*	F	R^2	$R^2\alpha$	Sig
Insolvent	19				
Market Distribution	19	81.843	0.82	0.81	0.000

Table 17.

Pearson's correlations of population density and food insecurity density

Variable	*N*	*r*
Food Insecurity Density	19	
Population Density	19	0.888**

**Indicates significance < 0.001

Table 18.

Regression of population density and insecurity density

Variable	*N*	F	R^2	$R^2\alpha$	Sig
Food Insecurity Density	19				
Population Density	19	67.823	0.789	0.777	0.000

FIGURES

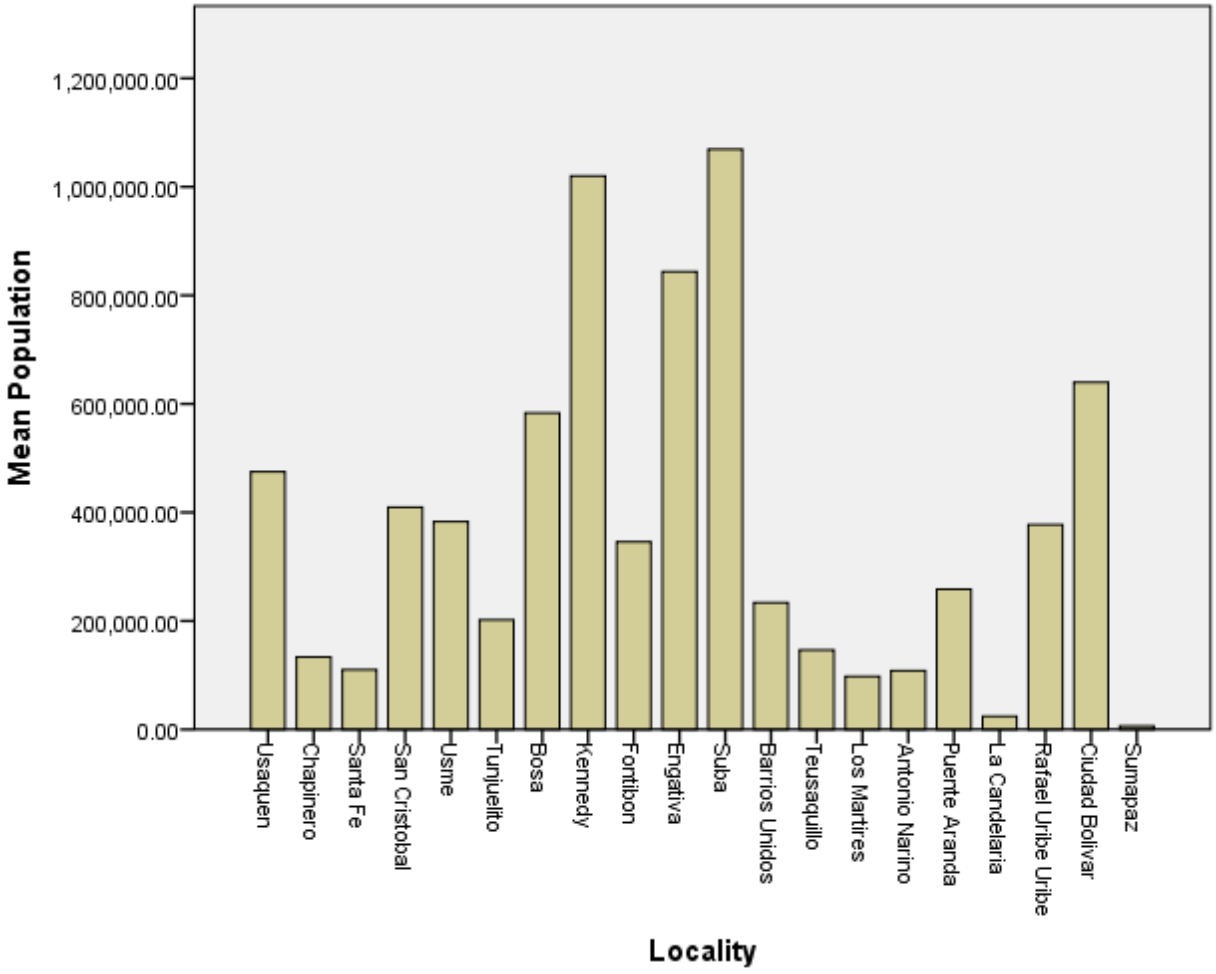

Figure 1. Histogram of mean population by locality

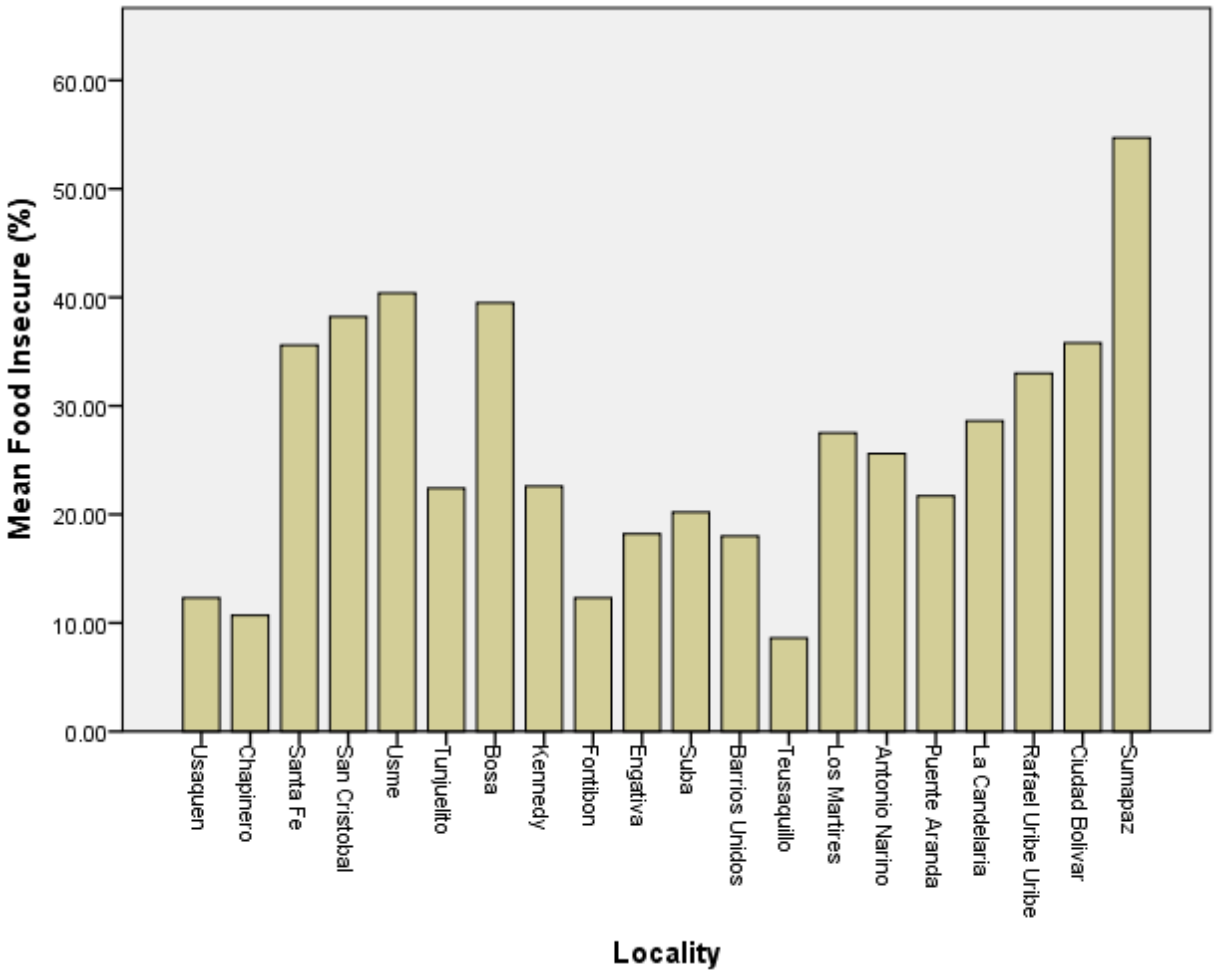

Figure 2. Histogram of mean food insecurity by locality

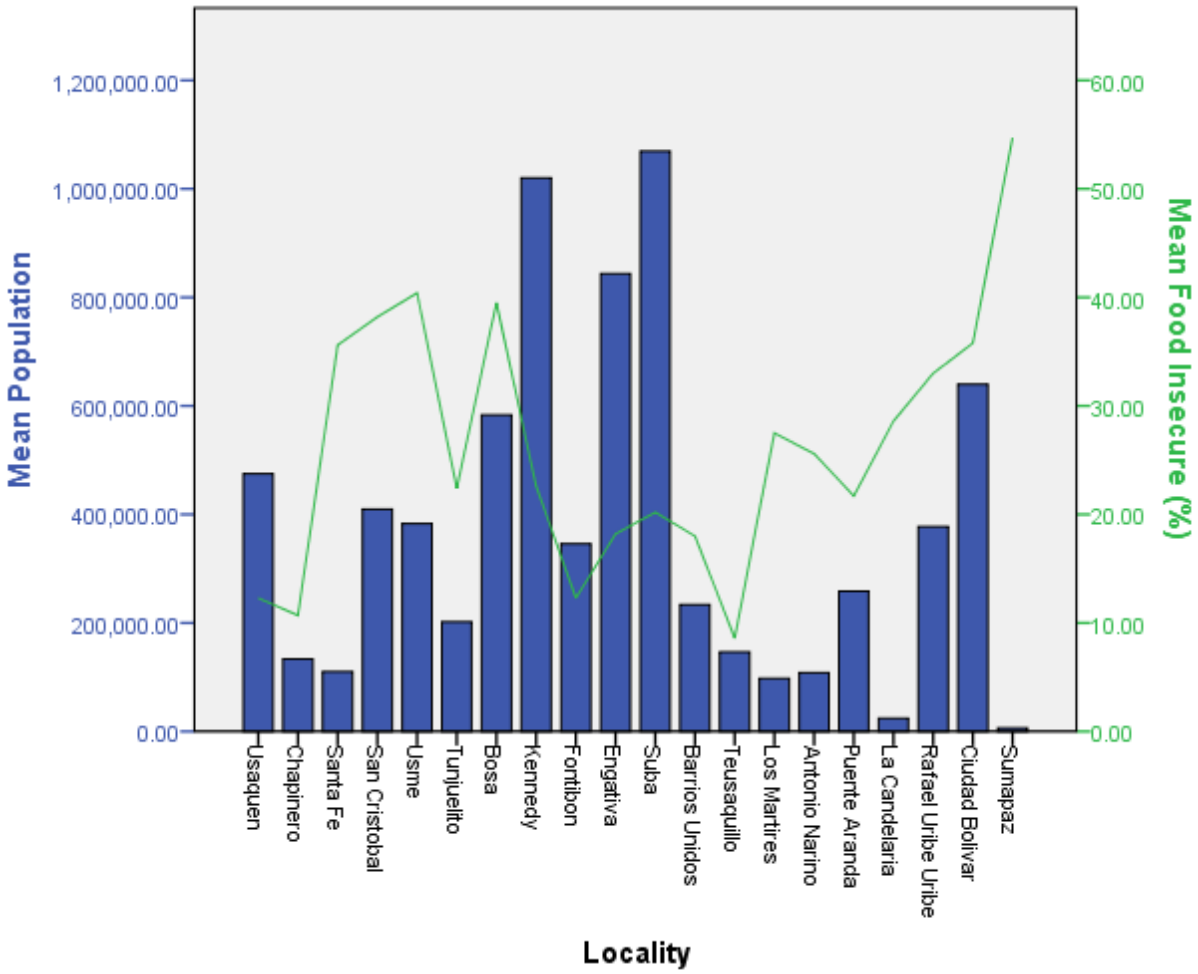

Figure 3. Dual axes of mean population and mean per centum food insecurity by locality

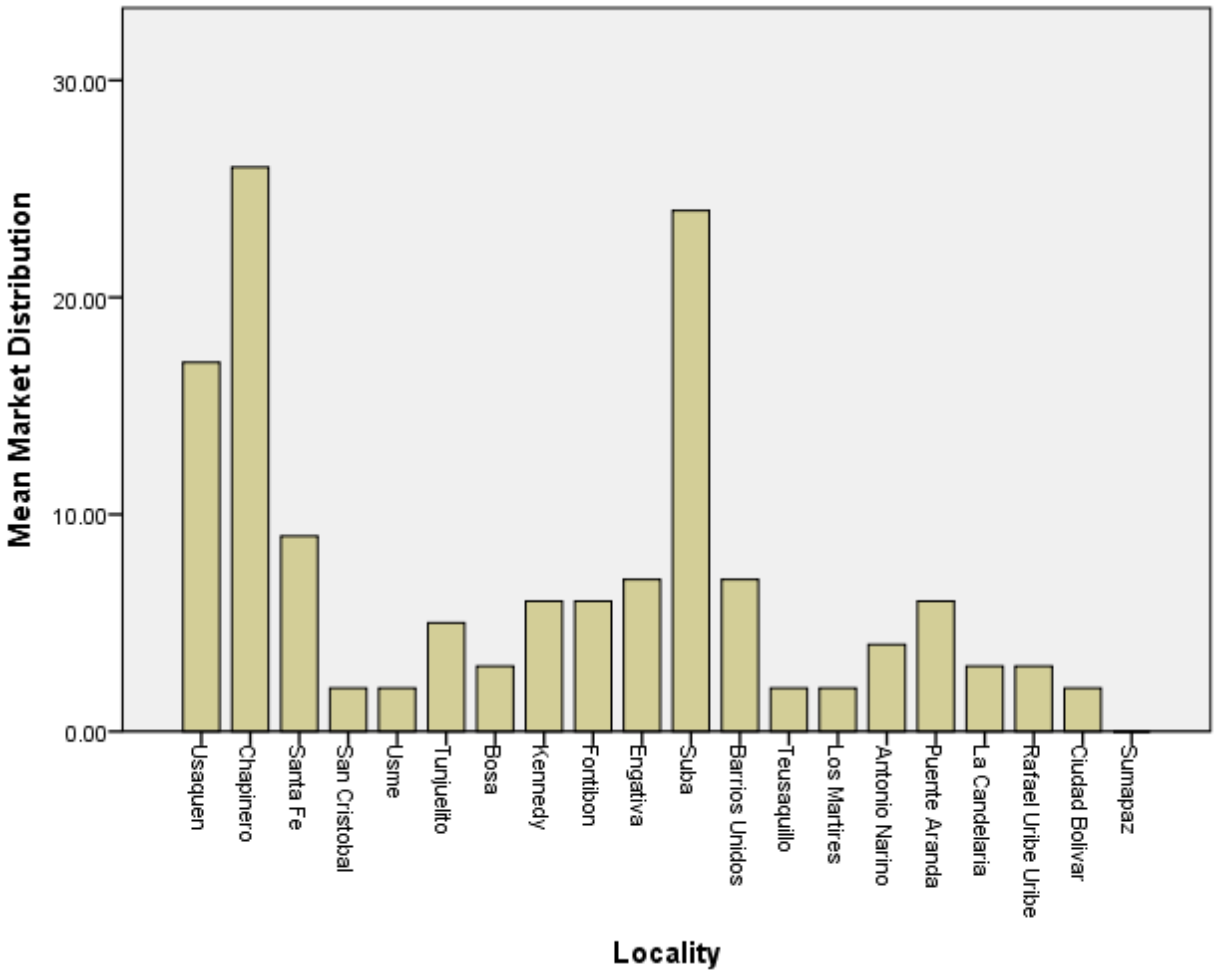

Figure 4. Histogram of mean market distribution by locality

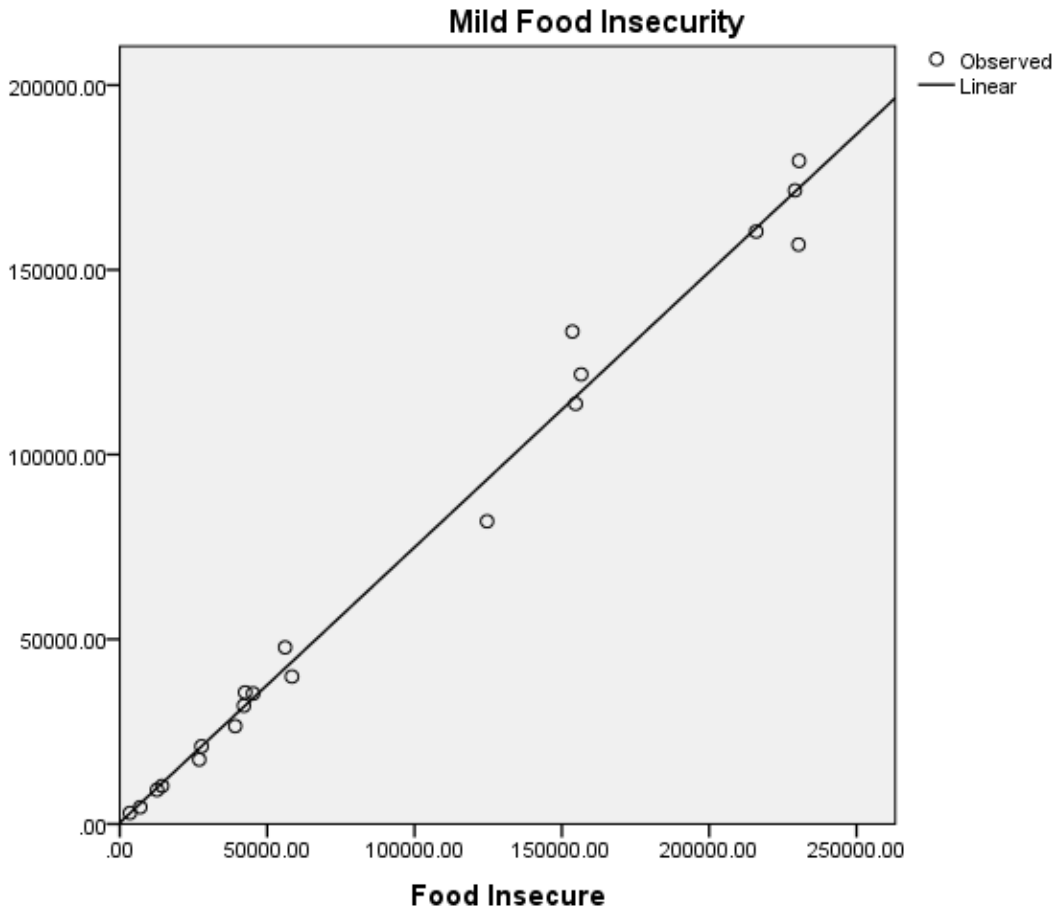

Figure 5. Scatterplot of food insecurity and mild food insecurity.

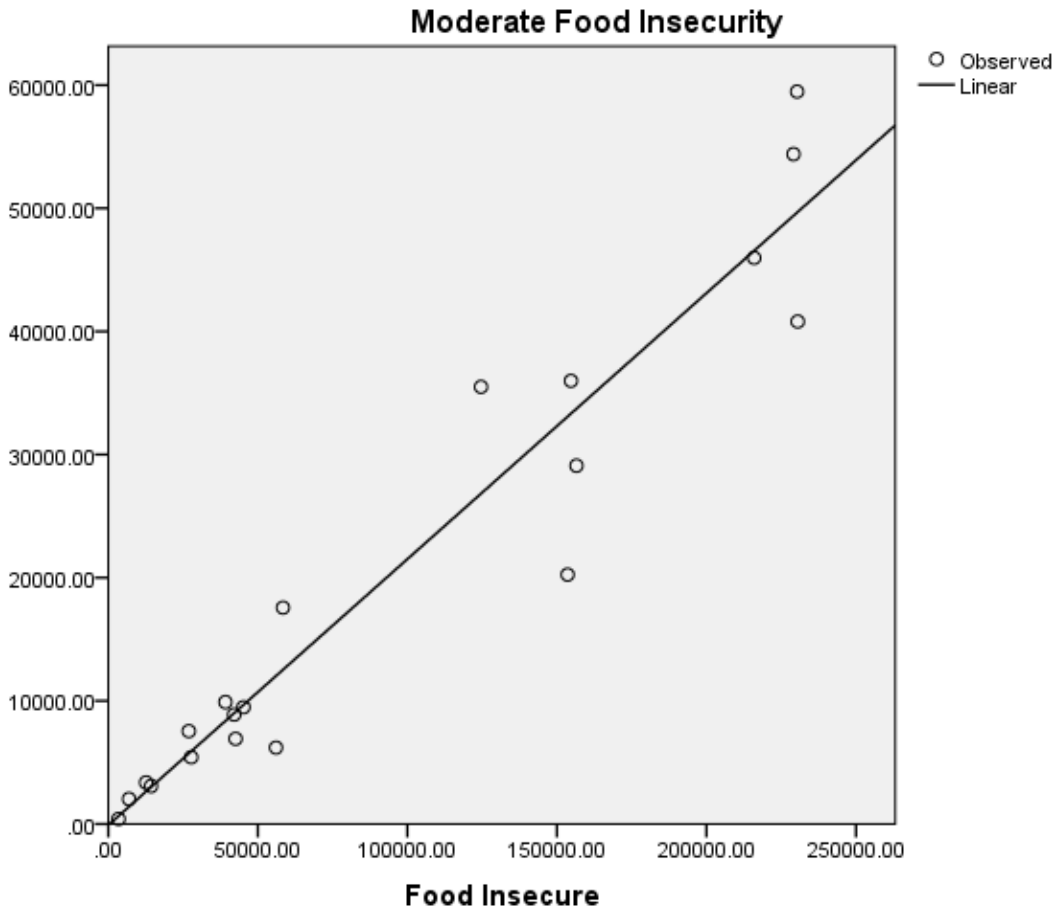

Figure 6. Scatterplot of food insecurity and moderate food insecurity.

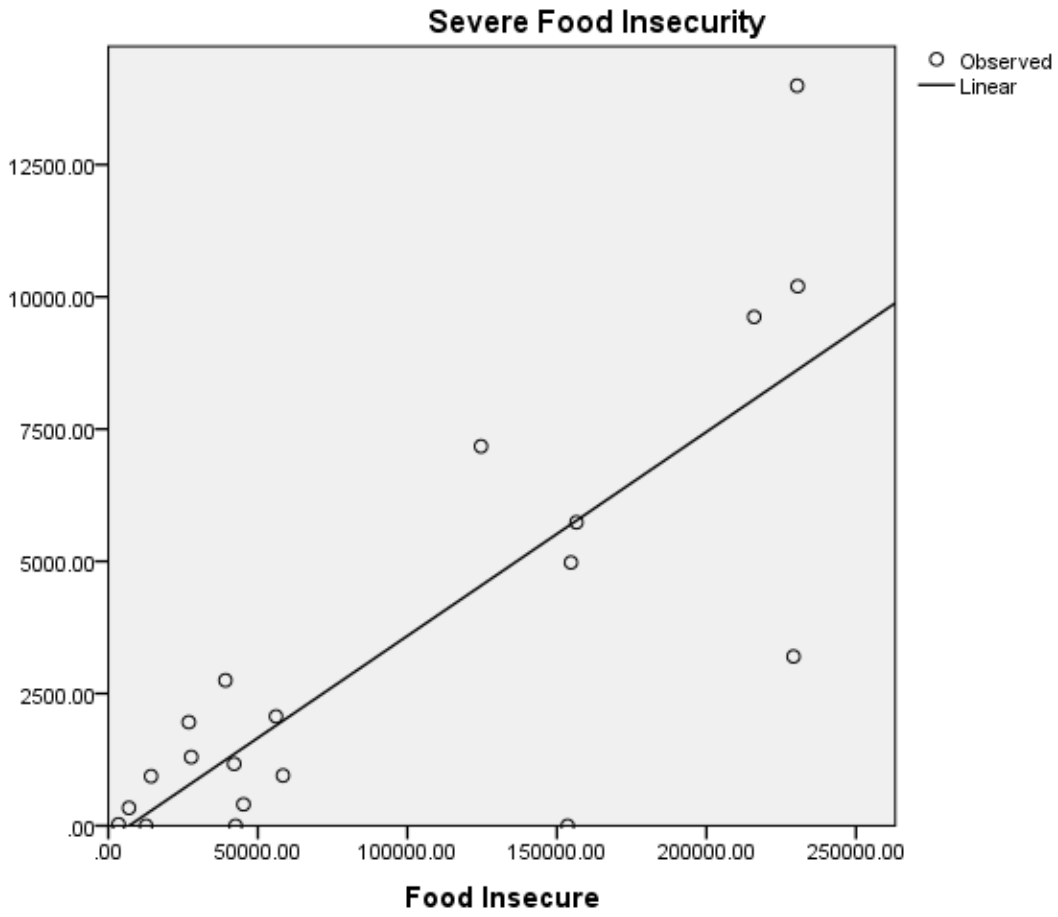

Figure 7. Scatterplot of food insecurity and severe food insecurity

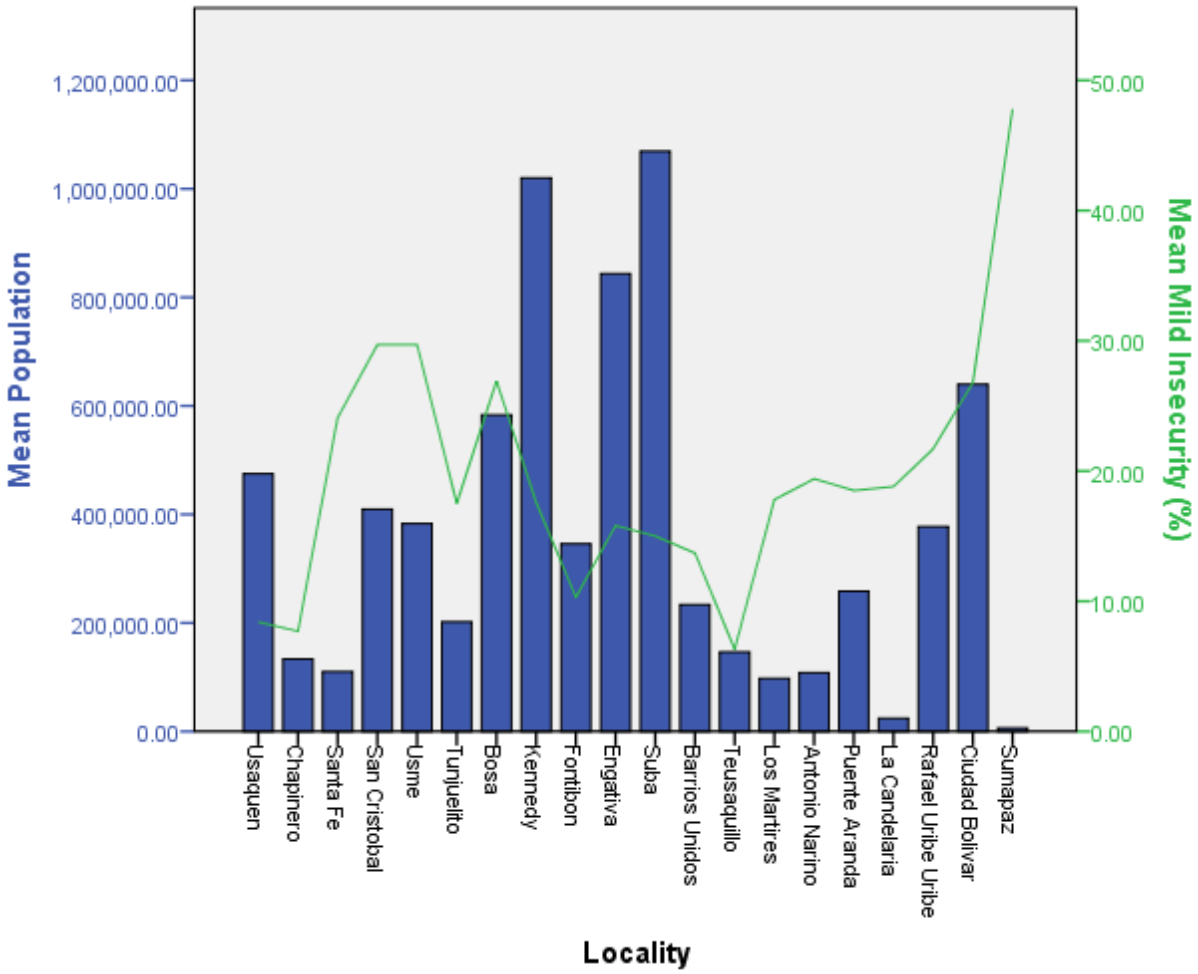

Figure 8. Dual axes of mean population and mean per centum mild food insecurity by locality

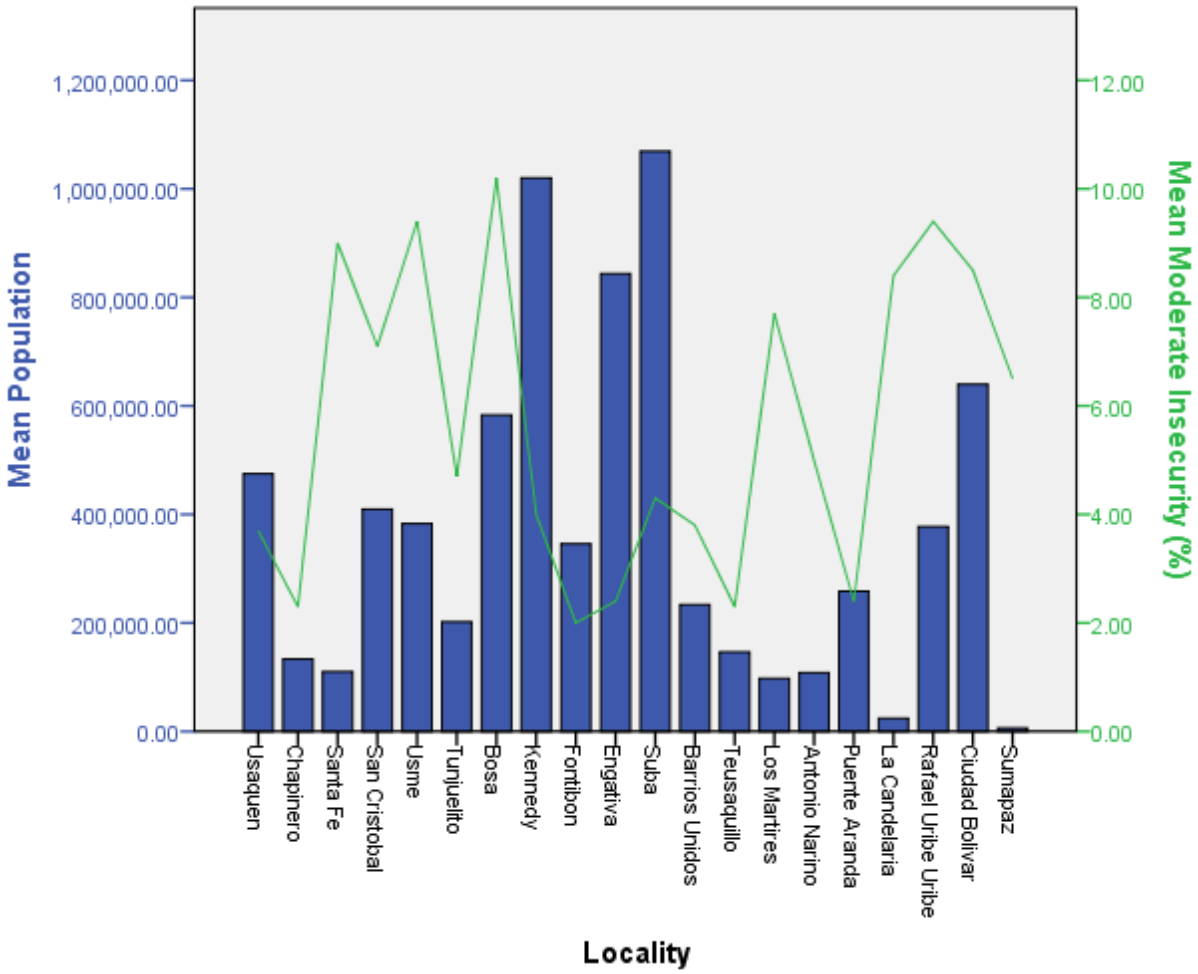

Figure 9. Dual axes of mean population and mean per centum moderate food insecurity by locality

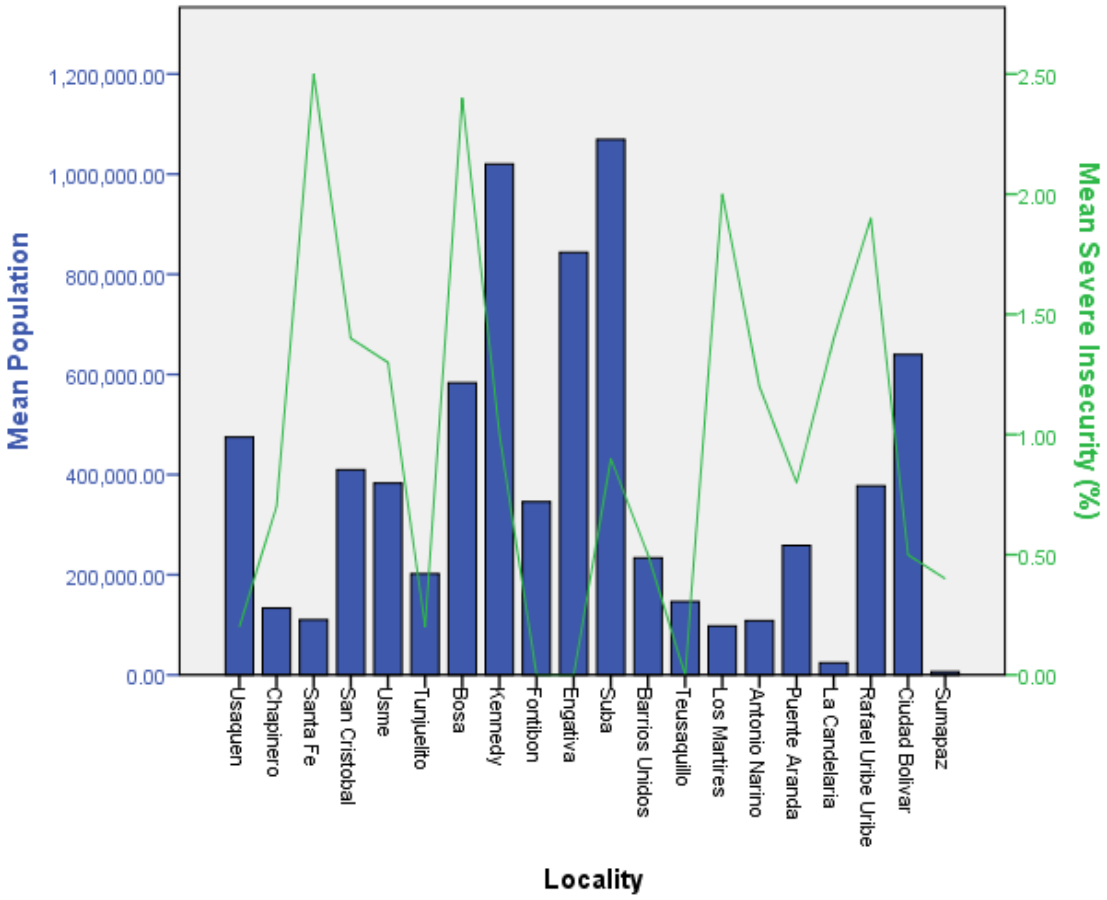

Figure 10. Dual axes of mean population and mean per centum severe food insecurity by locality

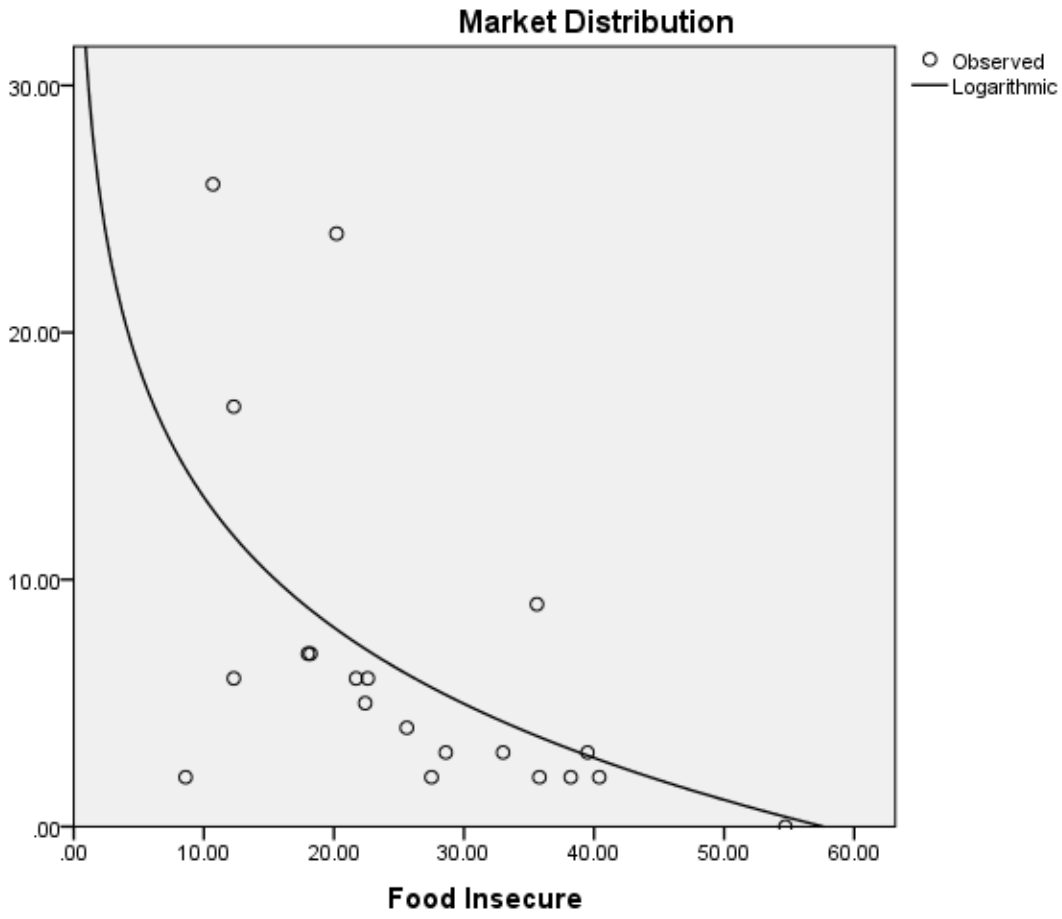

Figure 11. Scatterplot of food insecurity and market distribution

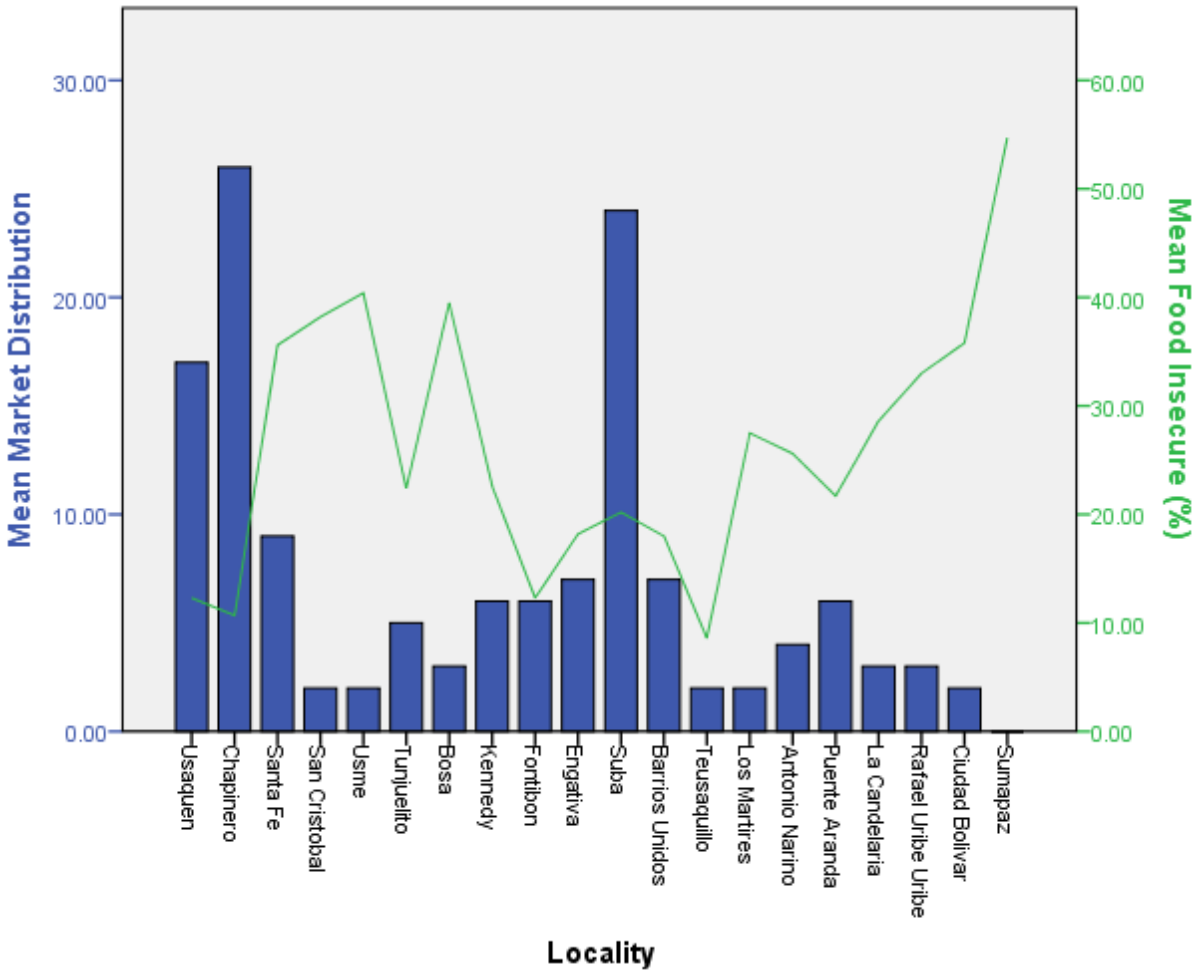

Figure 12. Dual axes of mean market distribution and mean per centum food insecurity by locality

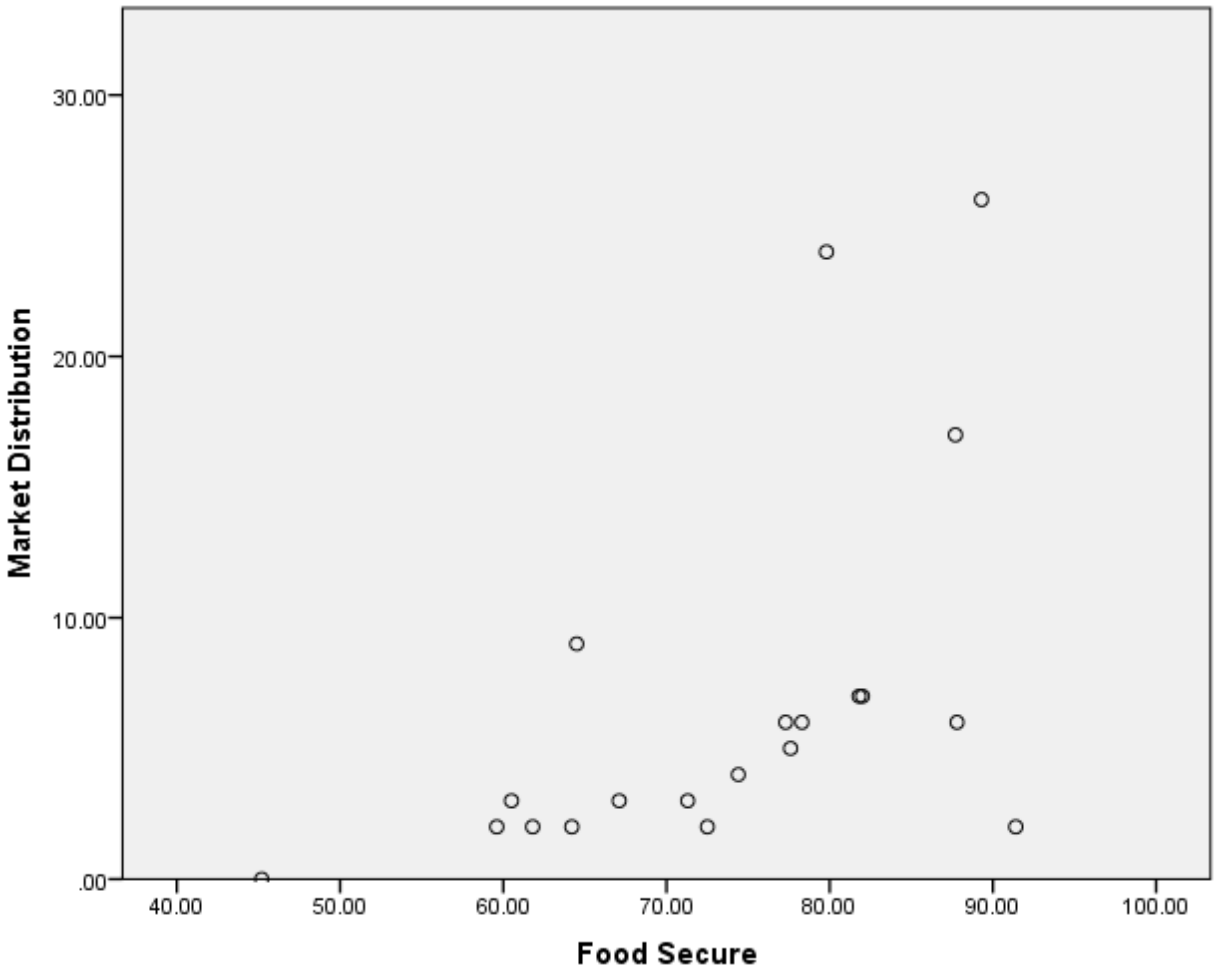

Figure 13. Scatterplot of the food secure and market distribution

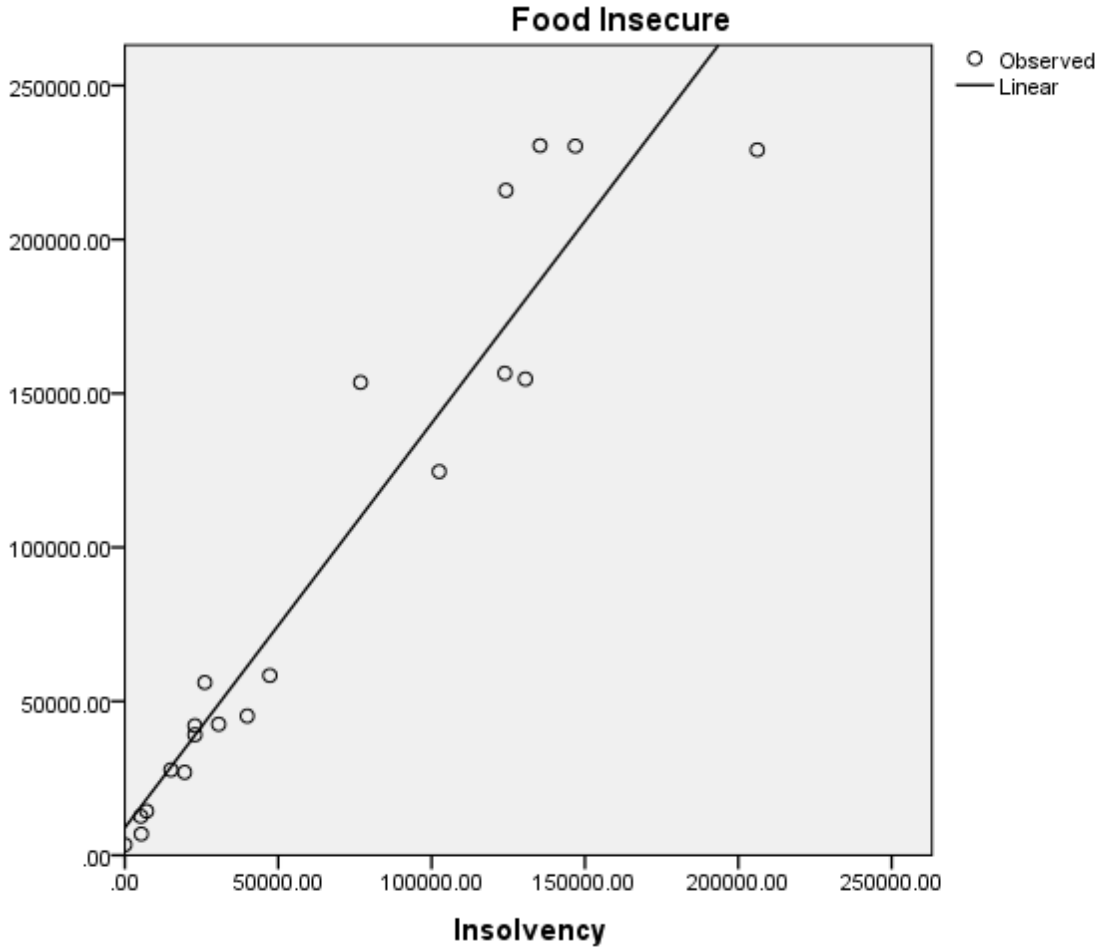

Figure 14. Scatterplot of food insecurity and insolvency

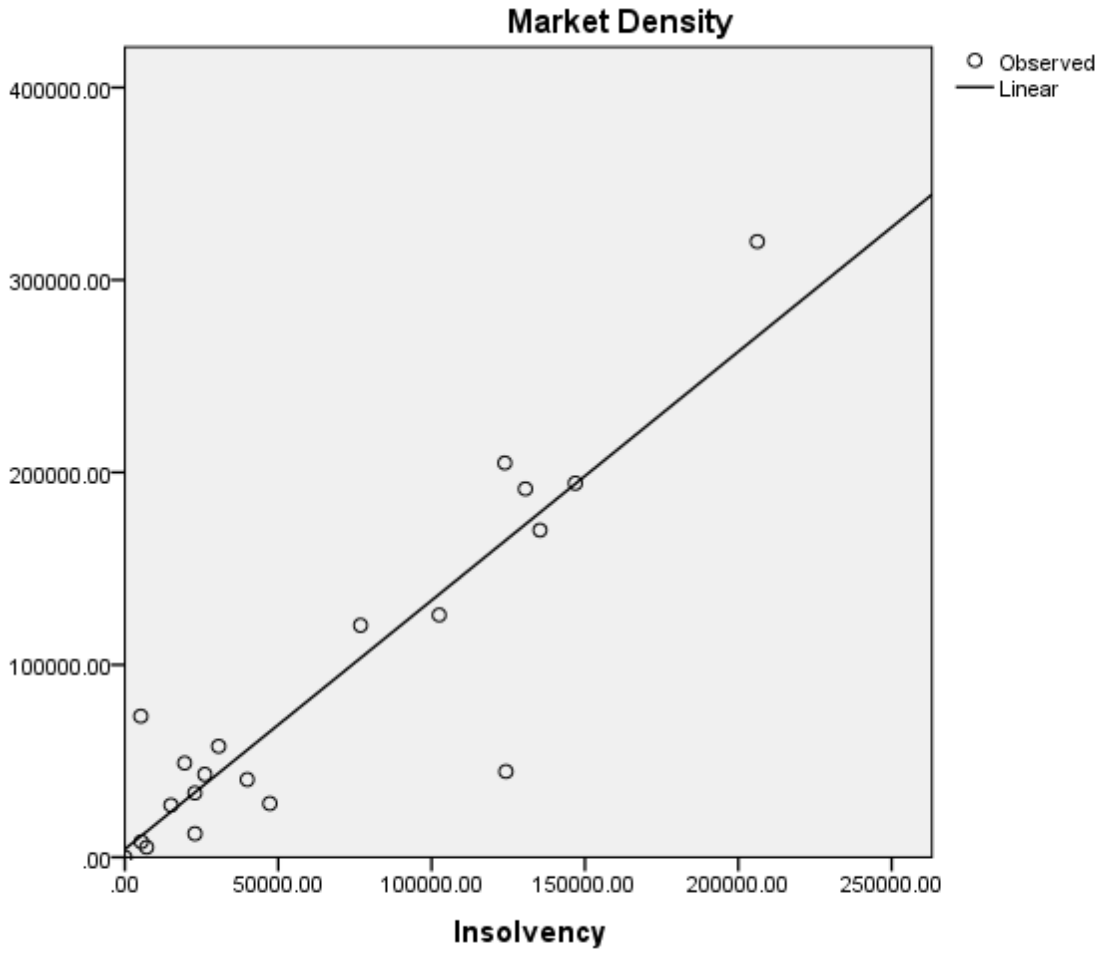

Figure 15. Scatterplot of market density and insolvency

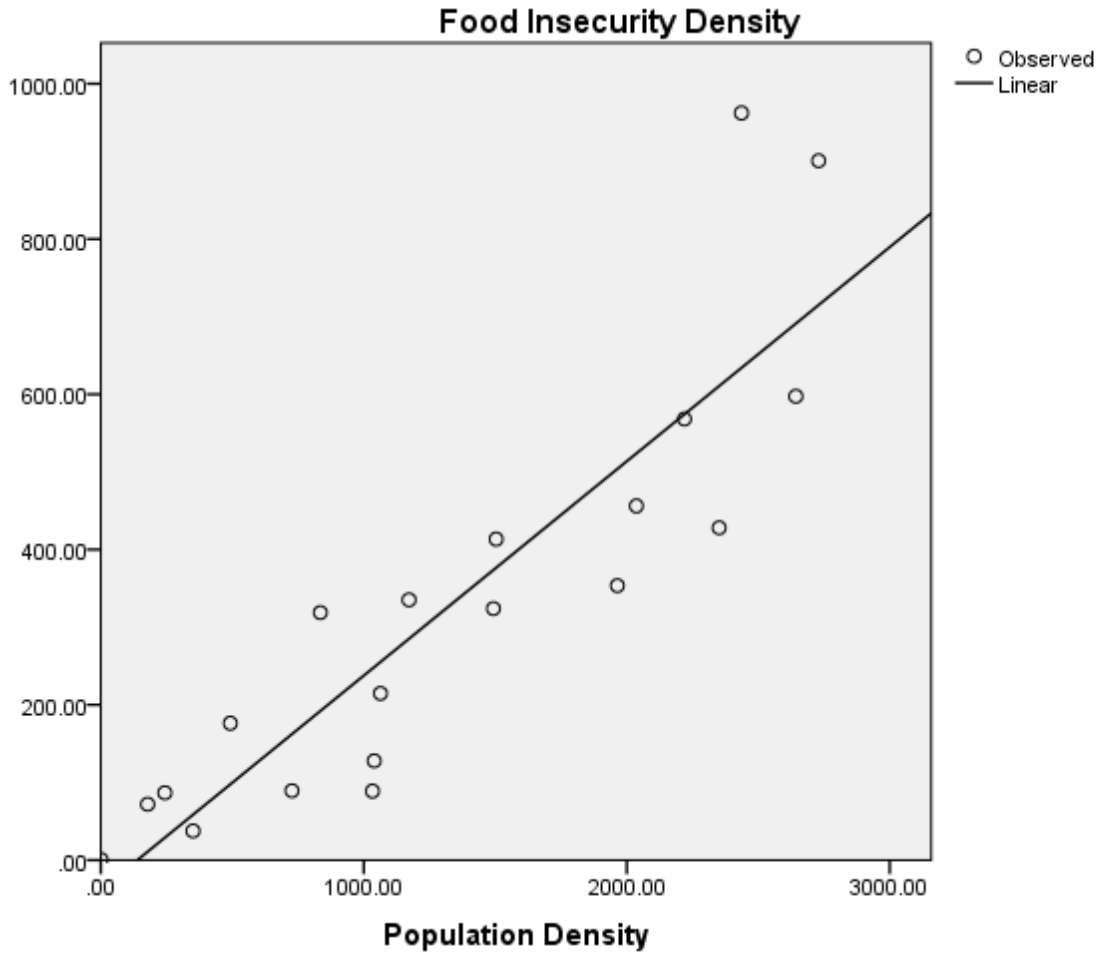

Figure 16. Scatterplot of population density and food insecurity density

APPENDICES

APPENDIX A

September 19, 2014 IRB Application #: 14110

Proposal Title: Public Health Implications of Colombian Diaspora: Pediatric Food Insecurities of Ciudad Bolivar

Type of Review: Initial-Exempt

Investigator(s):

Mr. Mark Johnson
Dr. Kimberly Quigley
Department of Kinesiology and Health Studies
College of Education and Professional Studies
Campus Box 189
University of Central Oklahoma
Edmond, OK 73034

Dear Mr. Johnson and Dr. Quigley:

Re: Application for IRB Review of Research Involving Human Subjects

We have received your application and materials for review by the UCO Institutional Review Board (IRB). The UCO IRB has determined that the above named application is APPROVED BY EXEMPT REVIEW. The Board has provided exempt review under 45 CFR 46.101 (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Date of Approval: 9/19/2014

Exempt projects are subject to annual review to determine if any modifications have been made that would change the status of the project. Any modifications to the project must be requested in writing prior to incorporation into the study.

On behalf of the UCO IRB, I wish you the best of luck with your research project. If our office can be of any further assistance, please do not hesitate to contact us.

Sincerely,

Robert Mather, Ph.D.
Chair, Institutional Review Board
NUC 341, Campus Box 132
University of Central Oklahoma
Edmond, OK 73034
405-974-5479
irb@uco.edu

APPENDIX B

ACRONYMS

ANDI – Business sector player (Co)

ACCU – Peasant Self-Defense Group of Córdoba and Urabá. Paramilitary (Co)

AUC – United Self-Defense Forces of Colombia. Paramilitary (Co)

BACRIM – Various syndicates representing a myriad of criminal activities (Co)

CIA – US Central Intelligence Agency

DAS – Departmento Administrative de Seguridad (not under security forces) (Co)

DANE - Departmento Administrative Nacional de Estadistica (Co)

DEA – US Drug Enforcement Agency (US)

DIA – US Defense Intelligence Agency (US)

DIJIN – Directorate of the Judicial and Investigation Police (Co)

ELN – National Liberation Army. Guerrilla (Co)

EPL – Popular Liberation Army. Guerrilla (Co)

F2 – Police intelligence (now DIJIN)

FARC(-EP) – Revolutionary Armed Forces of Colombia (Ejercito del pueblo). Guerrilla (Co)

FENALCO – Business sector player (Co)

FPL – Peoples Liberation Forces. Guerrilla (Co)

GIS – Geographical Information Systems

GMO – Genetically Modified Organism

M19 – April 19 Movement. Guerrilla (Co)

NGO – Non-governmental Organization

OAS – Organization of American States

OPDH – Oficina Permanente de Derechos Humans – (Human rights office)