

ABSTRACT

WYANT, AMANDA DAWN. Household- and Country-Level Predictors of Household Food Insecurity (Under the direction of Dr. Sarah Bowen and Dr. Steven McDonald).

According to the World Food Programme, about one in nine people in the world experiences food insecurity, meaning they do not have enough food to have a productive life (wfp.org 2018). Despite a global food surplus, many individuals remain hungry due to an unequal distribution of food (Clapp 2014). Sociologists have contributed to debates over how economic integration and development affect indicators of health and well-being, including food insecurity. In particular, sociologists show that we cannot assume that development affects all people and all places equally. In this dissertation, I employ several theories of development, modernization, dependency, and critical globalization, to untangle the relationships between economic and social change and household food insecurity. Modernization theory argues that economic growth and global integration are generally beneficial, whereas dependency theory argues that global integration leads to the exploitation of less developed countries. My research examines if variations in well-being emerge mostly from differences between countries, as modernization and dependency theories suggest, or within countries, as more recent theories of development might argue. In doing so, I contribute to debates regarding major theories of development, including the modernization, dependency/world-systems, and critical globalization perspective. Chapter 3 analyzes how growth and economic integration impact households differently. I find that increases in GDP per capita are associated with decreased odds of household food insecurity. On the other hand, FDI is not related to food insecurity directly but has differing effects based on household income. Chapter 4 analyzes the relationship between household location and food insecurity to determine if rural or urban households are more likely to be food insecure and if country-level factors, such as urbanization and GDP, complicate the

relationship. I do not find a difference between rural and urban households in determining the odds of food insecurity. I do find that in countries with higher urbanization rates, urban households benefit, but that increases in GDP do not benefit urban households more than rural households. Chapter 5 examines gender-related policies at the country level – such as women having the right to use financial services, own land, or own other types of property – and gender views at the household level, to see whether they predict the likelihood of household food insecurity. I find that households in which the respondent expresses more egalitarian gender views, a proxy for the household’s level of “gender empowerment,” are less likely to be food insecure. Also, an increase in urbanization benefits households in unequal countries and disadvantages households in equal countries. This finding may indicate that urbanization does not fit as neatly with modernization theory as suggested. This dissertation provides insights into how development occurs differently and within and between countries, and how a variety of factors shape food insecurity. This research emphasizes the need for considering both household-level and country-level factors in future studies examining the processes that affect health and well-being.

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Household- and Country-Level Predictors of Household Food Insecurity

by
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DEDICATION

Dedicated to my parents, Ken and Clara Wyant. Thank you for all your support and encouragement.

BIOGRAPHY

Amanda Wyant grew up in Parma, Ohio with her brother Aaron. She graduated high school from Normandy High School in 2006. She attended Baldwin-Wallace College in Berea, Ohio and earned her Bachelor of Arts in Sociology and International Studies with minors in Spanish and Economics in 2010. Amanda received great mentorship at BW inspiring her to attend graduate school. She received her Master of Science in Sociology in 2013 from North Carolina State University and continued on with her PhD studies.

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CHAPTER 1: INTRODUCTION

General Literature

According to the World Food Programme, about one in nine people in the world experiences food insecurity, meaning they do not have enough food to have a productive life (wfp.org 2018). Continued food insecurity across a lifetime is associated with a range of negative consequences, including increased illness, lowered productivity, and a higher likelihood of death (Chary et al. 2013; Jha 2009). Despite a global food surplus, many individuals remain hungry due to an unequal distribution of food (Clapp 2014). This was evident during the food crisis of 2008, when riots erupted as food prices increased by 75% globally, on average, yet more in some places (CNN.COM 2008).

Debates about the cause and consequences of food insecurity are fundamentally linked to debates about development and its effect on well-being. Operating within the modernization framework, some researchers argue that economic development, commonly measured in the form of gross domestic product (GDP) or foreign direct investment (FDI), will lead to spin-off effects across populations, generating country-wide improvements in well-being (Firebaugh and Beck 1994). For scholars adhering to a modernization perspective, global economic integration is the key to alleviating poverty and reducing food insecurity. Other scholars, influenced by dependency theory, argue that because economic integration often leads to more powerful countries exploiting less powerful countries, it does not contribute to the well-being of people in those countries and can even have negative impacts (Gunder Frank 1966). These scholars argue that insulating countries from the capitalist economic system through tariffs and other protections is the key to bettering lives of citizens in less developed countries (Baran and Sweezy 1966). Furthermore, dependency theorists argue that even successful cases of economic integration can

disproportionately benefit certain sectors or economic strata within countries, exacerbating inequality (Gunder Frank 1966). Recent theories of development argue more explicitly that we should examine within-country inequality rather than looking solely at relationships countries, as both modernization and dependency theory tends to do (Milanovic 2011; Robinson 2003). These scholars argue that class formation occurs across boundaries, through the consolidation of wealth to the transnational capitalist class and the weakening of the other class groups, regardless of their location (Robinson 2003).

My research examines if differences in well-being emerge mostly from differences between countries, as modernization and dependency theories would suggest, or within countries, as more recent theories of development might argue. I examine this debate by focusing on one of the most central human needs: access to food. Although some researchers have examined how economic development affects the prevalence of food insecurity within countries, few studies have considered how these relationships play out differently for various households. This study uses a multilevel approach to examine household-level and country-level characteristics in tandem and identify how they interact to shape the likelihood of food insecurity among households.

Theoretical Approaches

“Development” became a central focus after World War II, during the period of decolonization and European reconstruction (McMichael 2016). The divisions established during this time shape how we view countries today, with countries defined as capitalist or First World, communist or Second World, and the Third World (postcolonial nations). President Truman’s 1949 speech divided countries into those that were “modern” and those that were not and created a new agenda: using development and aid from the First World to contain communism in the

Second World and modernizing post-colonial countries. At the point that Truman said that we “must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas” (Truman 1949), a social construct of developed and underdeveloped countries emerged. This division was further solidified with the creation of Bretton Woods program, which created the World Bank and the International Monetary Fund (IMF) institutionalizing the concept of underdeveloped (McMichael 2016).

Development focuses on “meeting basic needs: sufficient food to maintain good health; a safe, healthy place in which to live; affordable services available to everyone; and being treated with dignity and respect” (Peet and Hartwick 2015:1). Although economic indicators are often used as a proxy for development, many argue that the goal of development is to increase human welfare (Sen 2001). Thus, in addition to economic indicators, researchers also use measures of well-being to assess development outcomes, including individual children’s likelihood of malnutrition and diarrhea, individual self-reported happiness, and prevalence of food insecurity (Austin, McKinney, and Thompson 2012; Burroway 2017; Tsai, Chang, and Chen 2011). Development scholars have historically relied on two primary theoretical perspectives, modernization theory and dependency theory, both of which aim to understand the consequences of a country’s trade and investment with other countries.

Based on the tenet that trade and global integration will “trickle down” universally, modernization theory extends an economic growth focus to include an emphasis on political modernization (nation building) and social modernization (Nederveen Pieterse 2010). Proponents argue that less developed countries benefit from their relationships with advanced economies, through access to export markets, capital, and technology (Gilpin 1987). Modernization theorists

argue that economic development promotes positive social changes, including higher rates of urbanization and lower fertility rates (Rostow 1960). Related to food insecurity, proponents of modernization suggest that technology generates economic growth and helps reduce hunger (Mihalache-O'Keef and Li 2011)

One of the most influential books on this perspective, Rostow's (1960) *The Stages of Economic Growth: A Non-Communist Manifest* discusses linear stages that appear to be natural and could be achieved by all countries. The stages are as follows: 1) traditional societies, 2) preconditions for take-off, 3) take-off, 4) the drive to maturity, 5) high mass consumption. Rostow's argument is based largely on the experience of the United States in the post-WW II era; critics argue that it fails to account for how political context including the use of multilateral organizations and trade relations aided in the rise of the United States' economy (McMichael 2016).

Although Rostow's book was originally published in 1960, neoliberal theories reiterate many of the same tenets. Peet and Hartwick (2015: 149) argue, "Modernization was the early sociocultural equivalent of neoliberalism." Many proponents of neoliberalism view free markets as the best solution to society's problems, resulting in a shift in political discourse and economic policies (Fligstein 2002). Neoliberal theory espouses a focus on the market rather than government programs to support citizens (Moore et al. 2011). As a result, neoliberal theory endorses privatization of state enterprises, which scholars argue reduces social welfare (Fourcade-Gourinchas and Babb 2002; McMichael 2016). Additionally, neoliberalism views deregulation as a path to success and emphasizes loosening regulations regarding trade and workers' rights (Fligstein 2002; Fourcade-Gourinchas and Babb 2002).

The World-Systems/dependency theoretical tradition espouses a contradictory position to modernization theory. Rather than promoting integration, dependency theorists argue that integration into global trade networks leads to unequal relationships, stalling development in countries in the Global South. Both world systems and the dependency theory focus on duality within the world, consisting of centers (powerful countries) and peripheries (less powerful countries) (Gunder Frank 1966). Instead of viewing development as linear and achievable by all, World Systems and dependency theory view development as relational, arguing that the development of some countries occurs at the expense of others (McMichael 2016). Dependency theorists argue that engagement with the capitalist world impoverishes periphery countries (Portes 2015). Dependency theory and world systems theory overlap greatly although world systems theory is broader in space (Portes 2015). Whereas dependency theorists examined how colonies were exploited, world systems theory emphasizes how core countries came into and fell out of power (Portes 2015).

Dependency theorists argue that peripheral countries tend to focus on agricultural products and the extraction of raw materials as their primary product of exchange. Because agricultural products and raw materials are not as profitable as manufactured projects, countries that specialize in primary products face a disadvantage (Emmanuel 1972). An additional drawback associated with agricultural production is an increased vulnerability to price fluctuations and environmental changes like droughts or natural disasters (Messer and Cohen 2007). Finally, the agricultural goods that are produced tend to be export products with little or no nutritional value for the country's citizens (Austin 2012). Dependency theory also argues that inequality within countries creates a dual society, with individuals connected with the developed

countries on the one side and individuals who are considered subsistence-based or pre-capitalist on the other (Gunder Frank 1966).

More recently, sociologists have debated the importance of the nation-state, with some arguing that with increased globalization, the nation-state is no longer relevant. Whereas modernization theory, dependency theory, and world systems theory all focus on relationships between nation-states, some scholars argue that we need to shift away from using the nation-state as our unit of analysis. Instead of focusing on divisions between core and periphery countries as central, they state that we instead need to focus on social hierarchies within countries, such as class, gender, race, and ethnicity. Although geography and nation-states continue to shape social life, scholars like Robinson (2012) argue that they are diminishing in their importance. This is consistent with the idea of the new geography of inequality, which argues that although inequality used to stem predominately from between-nation differences, within-country differences are becoming increasingly important (McMichael 2016). There is a group of global elites that are interconnected across countries; these elites continue to gain wealth, making inequality a transnational process rather than a national process (Robinson 2003).

Food and Agricultural Production in Relation to Theories of Development

An examination of the green revolution can serve as an example of how modernization theory and dependency theory can inform debates around food insecurity. The green revolution, starting in the 1940s, was a transfer of technology from developed countries to developing countries and included bioengineered hybrid seeds, increased mechanization, fertilizer use, and irrigation aimed at reducing hunger (McMichael 2016; Patel 2013). Green revolution proponents adopted a modernization perspective, arguing that through improvements in agricultural technologies, crop yields would increase and food insecurity would decrease. Critics, echoing

key points from dependency theory, argued that green revolution technologies would contribute to dependent development, reducing self-sufficiency and forcing developing countries to rely on the knowledge and resources from developed countries to continue to produce food.

The green revolution produced mixed results. Supporting modernization theory, the production of corn, wheat, and beans increased 300 percent in the 20 years following the start of the green revolution (McMichael 2016). However, high-input agriculture created differentiation within and among households, with negative impacts on women in particular (McMichael 2016). It also advantaged larger-scale farmers and disadvantaged smaller farmers; smaller farmers who did participate were likely to take out credit, were unable to earn enough to pay back their debts and had to sell their land; as a result further exacerbating landholding inequality (Clapp 2012).

The food riots and food shortages of 2008 provide another instructive example. Prices of key staples, including wheat, soybeans, rice, and corn, doubled over a short period; food was priced out of many people's reach, especially in developing countries (Clapp 2012). The fact that the market could not adequately supply food seemed to contradict the neoliberal ideal that the market is the most efficient way of providing food. Neoliberal proponents argued that demand had risen faster than supply, as a result of increases in the world population (Clapp 2012). Dependency theorists contended that the food crisis was related to the race to the bottom of many economies and the precarity that resulted (McMichael 2009). Developing countries increasingly depend on food imports, and as a result are dependent on world food price and experience vulnerabilities related to price fluctuation (Otero, Pechlaner, and Gürcan 2013).

When examining well-being, development sociologists have long considered what factors contribute to economic growth. We have historically looked at how countries differed. For example, studies have examined if increasing trade also increases growth (Clark and Mahutga

2013). Given the research from sociologists who focus on the geography of inequality arguing that we need to look at how class inequalities are consolidated across countries, we cannot keep only focusing on cross-national differences. Through this research, I examine if cross-national differences are still relevant or we need to focus within countries to understand inequality. This dissertation contributes to ongoing debates about development and the relationship between macroeconomic indicators and measures of well-being. Beyond this macro theoretical framework, this research also incorporates other theoretical perspectives. In my three substantive chapters, I use theories to examine how growth occurs unevenly based on income, household location, and gender rights and empowerment.

Current Project

Sociologists have contributed much to debates over how economic integration and development affect indicators of health and well-being. This dissertation contributes to debates over whether relationships between countries, or dynamics and inequalities playing out within countries, are more relevant to indicators of development. This dissertation examines how country-level and household-level factors influence household food insecurity. In doing so, I contribute to debates regarding major theories of development, including the modernization, dependency/world-systems, and critical globalization perspective. Beyond this macro theoretical framework, this research also incorporates other theoretical perspectives. I examine how gross domestic product (GDP) and foreign direct investment (FDI) interact with household income to shape the odds of food insecurity. I also consider how urbanization and GDP interact with household location to predict food insecurity. Finally, I examine how gender rights at the country level and household gender views shape food insecurity.

Growth and Integration

First, I examine how growth and economic integration impact countries and households (within countries) differently. While early development theorists (and some recent cross-national studies) frame development as something that occurs between countries, more recent analyses emphasize the importance of looking at within-country dynamics. For example, the new geography of inequality argues that the majority of poor people used to live in low-income countries, but now a majority of the world's poor live in middle-income countries (McMichael 2016). Rather focusing on whether countries are poor or rich, developed or developing, this perspective argues that we should examine how inequality occurs within countries. For example, poor and middle-class populations in Asian countries have gained the most from recent growth, whereas the lower-middle classes in rich countries have experienced stagnation of income (Milanovic 2016). Based on the new geography of inequality perspective, I hypothesize that certain groups within countries (for example, the wealthiest populations) will benefit the most from increases in GDP and FDI.

Spatial Inequality

Second, I include theories related to spatial inequality, specifically focusing on the theory of urban bias. Rural sociologists argue that many grand theories, including modernization and dependency theory, have not adequately considered the role of geographic location (Lobao 1996). Instead, they tend to treat nation-states as socially and economically homogenous (Lobao and Saenz 2002). In line with other critiques that argue that development does not play out equally within countries, Lobao (2004) emphasizes how stratification plays out within various locales, explicitly calling for more attention to rural and urban differences. The theory of urban bias argues specifically that “development” efforts have focused on urbanization and the

funneling of resources to urban areas, mostly at the expense of rural areas (McMichael 2016). Urban bias is defined as the “systematic privileging of urban interests, from health and education services through employment schemes to the delivery of food aid” (McMichael 2016:76). For example, in Thailand, there are large disparities in both income and infant mortality rates between rural and urban areas, with urban areas benefiting (Yiengprugsawan et al. 2010). Based on urban bias theory, I hypothesize that urbanization leads to improvements in the well-being of urban households but not of rural households.

Gender and Development

Third, this dissertation incorporates theory related to women’s role in development. Early development programs generally did not consider the role of women, and many development policies re-established existing gender inequalities or created new ones. Critics argued that development had differential effects for men and women and that women needed to be considered with the implementation of new programs¹ (Boserup 1970). This perspective led development agencies to create new programs and policies, with many focusing on creating income-generating ventures for women. Unfortunately, women remained on the margins of development policy (Jacquette and Staudt 2006). More recently, critics have argued that gender inequality needs to be “mainstreamed” into development programs (Jacquette and Staudt 2006). Rather than focusing on women only, we need to understand further how gender dynamics between men and women² relate to development and well-being. When women have more rights and economic control, they will also be able to direct how money is spent on increasing their

¹ Women in Development (WID)

² Gender and Development (WAD)

own well-being (Blumberg 1984). I argue that based on these perspectives, when countries have policies that guarantee women's rights, improvements in "development" will have greater outcomes compared to countries without favorable gender laws.

Approaches to Food Insecurity

This dissertation attempts to discern the way that country-level and household-level factors influence household food insecurity. According to the World Food Programme (WFP), food insecurity has three pillars: first, food availability, or having enough food; second, food access, or having appropriate foods; and third, food use, or having appropriate knowledge about food and sanitation. Most global food insecurity focuses on the first pillar, individual or household food availability, although some studies have started to consider food access and food use as well (Pendleton, Crush, and Nickanor 2014; Rammohan and Pritchard 2014).

Many studies of individual or household food insecurity measure food insecurity in one of four ways, all of which fall into the food availability pillar. Food availability tends to be measured through food expenditures at the household level (De Brauw and Harigaya 2007; Karakaplan, Naufal, and Vargas-Silva n.d.; Karamba, Quiñones, and Winters 2011; Nguyen and Winters 2011). Others use food consumption data to examine dietary diversity to see if households receive the correct nutrition in addition to enough calories (Antón 2010; Azzarri and Zezza 2011; David, Moncada, and Ordonez 2004; Nguyen and Winters 2011; Nord 2014; Sraboni et al. 2014). Some studies focus on children's nutrition and use anthropometric measures including weight for height (WHZ), height for age (HAZ), and weight for age (WAZ), in order to capture long-term food insecurity and malnutrition (Cameron and Lim 2005; De Brauw and Harigaya 2007; Linnemayr, Alderman, and Ka 2008).

Household scales aim to capture both food access and anxiety related to acquiring food. These scales appear to be the most inclusive and sophisticated way to measure food insecurity. The most well-known international scale, the Household Food Insecurity Access Scale (HFIAS), includes nine questions regarding food insecurity (Martin-Prevel et al. 2012), although some studies use a truncated version. Items used in this scale gauge the respondent's feelings of uncertainty or anxiety, perceptions of household food being insufficient quality or food-type preference, and inadequate food intake and its physical consequences (Carletto, Zezza, and Banerjee 2013). This type of measure adds the benefit of considering respondents' perception of food insecurity rather than focusing on caloric intake or anthropometric measures.

Cross-national studies evaluate food insecurity for a country as a whole. Most examine the production of food or food supply at the country level (Ben Slimane, Huchet-Bourdon, and Zitouna 2016; Jenkins and Scanlan 2001). Many studies focus on food-deprived individuals and the average caloric deficit for the country (Austin et al. 2012; Kick, McKinney, and Thompson 2011), dietary energy supply adequacy (Ben Slimane et al. 2016), and caloric consumption per capita (Brady, Kaya, and Beckfield 2007; Firebaugh and Beck 1994; Mihalache-O'Keef and Li 2011; Wimberley and Bello 1992). Others focus on the prevalence of food insecurity or malnutrition within the country. For example, some studies examine the percentage of children who are moderately or severely wasted within the country (Jenkins, Scanlan, and Peterson 2007; Scanlan 2001, 2004), explicitly examining characteristics such as the percent of children falling below normative values for weight for age (Jenkins and Scanlan 2001).

Summary of Chapters

This dissertation is divided into several chapters. Chapter 2 explains the research methodology that I use throughout my dissertation. Chapter 3 examines how country-level

factors related to economic integration (GDP per capita and FDI) shape food insecurity. Chapter 4 analyzes the relationship between household location and food insecurity to determine if rural or urban households are more likely to be food insecure and if country-level factors, such as urbanization and GDP, complicate the relationship. Chapter 5 examines gender-related policies at the country level – such as women’s right to use financial services or own land or other types of property – and gender views at the household level, to see whether they predict the likelihood of household food insecurity. Chapter 6 concludes my research with a summary of how the three empirical chapters fit within the broader framework of the sociology of development.

CHAPTER 2: METHODS

Data

The household-level data comes from the World Value Survey (WVS). The WVS includes nationally representative surveys conducted in almost 100 countries representing approximately 90 percent of the world's population. My research uses Wave 6 (2014) of the data, which consists of 61 countries, although after accounting for missing data, my models use 42 countries. Data for this wave were collected between 2010-2014. In comparison to the global average, the countries included in my models tend to have higher GDP, a higher percentage of urban citizens and a smaller percentage of food imports. The sample also includes a larger share of Asian countries (25 out of 49 Asian countries) than countries from other regions (10 out of 54 African countries; 10 out of 46 Latin American countries; 11 out of 37 European countries; 2 out of 19 Oceania countries). Countries within the study use the same questionnaire, translated and altered for cultural appropriateness. This survey builds on the European Values Survey. Various sampling methods are used, including full probability or a combination of probability and stratified, but all countries aim at obtaining as many Primary Sampling Units in the sample as possible. The survey draws samples from the entire population of individuals 18 years and older. I weight the data using a person-level weight, provided by the WVS to represent the demographics of each country accurately. I opt not to weigh based on country population since I do not believe it fits with my research questions.

Dependent Variable – Household Level

The WVS includes a variable regarding *food insecurity*. The question asks, “In the last 12 months, how often have you or your family gone without enough food to eat?” The potential responses include often, sometimes, rarely and never. The original distribution of the variable

was 5.40%, 15.52%, 19.88% and 59.21% respectively (see Appendix A Table 4 and Figure 1). I recoded the variable into two groups, those who felt some amount of food insecurity and those who did not experience any food insecurity within the last year. Other studies use similar indicators as a measure of food insecurity, for example by assessing whether households had enough food over the last twelve months (Goodman et al. 2014; Neff 2013; Price and Peterson 2016; Temple 2008). Although some studies use this question as part of a multi-item food security measure or module (Raffaelli et al. 2012; Whiting and Ward 2009), due to the nature of the WVS, I use a single indicator. My indicator is a holistic measure of food insecurity that focuses on participants' assessments, rather than calculating food expenditures or consumption patterns (e.g., calories consumed), or weight-to-height ratios to measure children's malnourishment.

Independent Variables – Household Level Variables

I use a household *income* indicator from the WVS, which is a self-reported income decile. The indicator aims to capture income in a harmonized manner across countries. The question asks a respondent to choose a number from an income group, with 1 being the lowest income group and 10 being the highest. They ask the respondent to, “specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in.”

Another key variable is related to women's empowerment at the household level. Although most research focuses on how women's empowerment leads to a decrease in food insecurity, the WVS does not have an adequate variable to capture women's empowerment. Instead, I use several indicators to capture respondents' attitudes regarding gender roles, which I call *egalitarian gender views*. Following Constantin and Voicu (2014), I use an index for three questions asked in the WVS survey. These measures indicate the respondent's views on

women's and men's roles in public and private spheres, including paid employment and household labor. The following questions from the WVS were included in the original study by Constantin and Voicu (2014): "On the whole, men make better political leaders than women do"; "A university education is more important for a boy than a girl"; "On the whole, men make better business executives than women do." Their study finds an index of these measures adequately captures attitudes about gender roles. I add a final indicator: "When a mother works for pay, the children suffer." This variable is also measured on the same scale. I used principle-components factor analysis with varimax rotation to generate the variable. For the factor, the eigenvalue was 2.34 and the proportion explained was .47 (alpha =.70).

I also use a variable, *urban household*, which situates households within either rural or urban settings. The WVS captures this by recording the size of a town that a respondent lives. Following previous research, I categorize towns with 2,000 or fewer inhabitants as "rural" and towns with more than 2,000 inhabitants as "urban" (Hamilton, Villarreal, and Hummer 2009).

Household – Level Control Variables

I use several control variables, determined by prior studies to predict food insecurity at the household level. First, I use the *age of the respondent* answering the survey. Age is a continuous variable. Mothers' age positively affects children's nutrition (Antón 2010), in contrast to studies finding that older age is associated with an increased likelihood of food insecurity, due to lessened ability to engage in agricultural labor (Nagata et al. 2012). Second, I use the *marital status* of the respondent, recoded as either married or non-married. Members of single-parent households are more likely to be food insecure than members of households with two parents present (Bronte-Tinkew and DeJong 2004; Cameron and Lim 2005). Third, I use an indicator of whether there are *children* within the household, recoded as children being present

or not present in the household. Households with more children tend to experience more food insecurity compared to those with fewer children (Antón 2010; Balk et al. 2005; Nagata et al. 2012). Fourth, I use the respondent's level of *education*, recoded into three categories: primary, secondary, and post-secondary education. Research suggests that those with less than high school education are more likely to be severely food insecure (Ben-Davies et al. 2014). Finally, I use a variable that indicates if the main wage earner is *employed* or not. Households without permanent employment are more vulnerable to food insecurity compared to households with full-time workers (Alem and Söderbom 2012). I also control for if the person responding to the survey is *female* or male.

Independent Variables – Country Level

The most commonly used indicator for understanding food insecurity at the country level is *gross domestic product GDP*, which comes from the World Bank. I use GDP per capita purchasing power parity (PPP). This measure allows for comparisons between countries. The measure is developed from how much of each respective currency would be required to buy the same amounts of goods and services in each country (Milanovic 2016). Most scholars within the development literature opt to use GDP per capita PPP rather than total GDP (Austin and McKinney 2012; Beckfield 2004; Brady et al. 2007; Burroway 2015).

Laws and policies at the country level can provide avenues for gender empowerment, which I incorporate into my models. I include several indicators of gender parity from the Social Institutions and Gender Index (SIGI), which comes from the OECD's Gender, Institutions and Development Database. The first variable – *land ownership* – measures if women have equal rights, both culturally and legally, to land ownership. The second variable – *non-land ownership* – measures if women have equal rights, both culturally and legally to non-land resources such as

property. The last measure – *financial assets* – measures if women have the same rights concerning access to banks, loans, and other financial assets. The three different variables have the same three possible categories: the first indicating that the law guarantees the same rights to both men and women (coded as 0); the second indicating that the law guarantees the same rights but there are some customary, traditional, and religious practices still acting as a barrier (coded as .5); and the third indicating that the law does not guarantee the same rights for both men and women (coded as 1). I ran a factor analysis to see if creating an index variable was suitable. For the factor, the eigenvalue was 2.05 and the portion explained was .69 (alpha=.68). I created an index adding the values for each of the three dimensions into one variable. I named the variable *unequal gender laws*, where a higher number would indicate more unequal laws and a lower number would indicate more equal laws. The variable ranges from 0-5.

An indicator variable for *urbanization* also comes from the World Bank. Urbanization is measured as the urban population calculated as a percentage of the total country population. I also use an indicator of *foreign direct investment (FDI) measured* as a percentage of GDP, which comes from the World Bank. FDI measures the net inflows of investment in a company in one country from an investor from a different company. I use *agricultural raw material exports as a percentage of merchandise exports* which also comes from the World Bank. Prior research and theories suggest a link between well-being and agricultural exports. Increased levels of agricultural exports from developing countries are associated with detrimental outcomes in those countries, including increases in poverty and inequality (Gissinger and Gleditsch 2015) and an increase in the severity of hunger (Austin et al. 2012). Additionally, agricultural exports have been linked to environmental degradation and as a result, an increased malaria prevalence (Noble and Austin 2016).

Descriptive Statistics

Table 2.1 shows the descriptive statistics for the variables used in this study.

Approximately 40% of the sample had experienced some food insecurity in the last year. The sample included a majority of respondents who had a secondary education (54.67%). The sample was also predominately female (58.32%). Most of the respondents were married (61.68%), employed (75.52%), had children (67.56%), and lived in urban households (83.45%). Age ranged from 16-98 with a mean of 39 years. Income ranged from categories of 1-10, with 1 being the lowest income decile and 10 being the highest income decile.

FDI, measured as a percentage of GDP, ranged from -79.7% to 28.9% and had a mean of 2.61%. A negative number indicates that a country invests more in foreign countries than receiving outside investments. Agricultural exports as a percentage of total exports averaged 2.6% and ranged from .01% to 10.8%. GDP per capita ranged from \$1,510 to \$73,510, with an average of \$16,210. Finally, the percent of the countries' population residing in urban areas (urbanization) was 62.7%, on average and ranged from 26% to 98%.

Data Diagnostics

I used correlation matrices to check for multicollinearity among the variables in the sample. I created one correlation matrix for Level 1 variables and another matrix for Level 2 variables. All correlations are under .70, except for Non-Land Rights and Land Rights, which are included in an index together. I also checked using the variance inflation factor (VIF). The only variables which have a VIF above 4 are the variables, age and age-squared, which is to be expected (See Appendix A, Table 2). I tested for heteroscedasticity using the *hettest* command in Stata 14.2 following an OLS regression model. The Breusch-Pagan/Cook-Weisberg test

indicated heteroscedasticity was present. Some have argued that there is not an adequate solution for heteroscedasticity for logistic models (Buis 2010).

I examined the analytic sample (Tables 2.2 and 2.3) versus my full sample (See Appendix A, Table 3) to determine any potential for sample selection bias. Compared to the full sample, my analytic sample has a higher amount of food insecure households (40% compared to 34%), more women (58% compared to 52%), fewer households with children (68% versus 71%), more people in urban households (83% versus 81%), and lower average age. The following country averages are also different for my analytic sample: lower FDI, higher agricultural exports, lower GDP, and lower urbanization rate.

I examined the mean of the dependent variable, food insecurity, in each country by my indicator variables using a scatter plot to determine if any outliers exist. There are several outliers in my models: Rwanda, Bahrain, Kuwait, and Cyprus. I ran my models with and without the outliers and did find several differences. In Chapter 3, the interaction between income and GDP (Table 3.1, Model 5) was not statistically significant but then became significant when excluding outliers. Also, the interaction between income and FDI was significant (Table 3.1, Model 6) and removing the outliers made it not significant. I have kept the outliers in the models and added footnotes to these models.

Estimation Technique

To address my research questions, I use multilevel modeling. This is an appropriate method since households are nested within countries. Multilevel modeling has become a standard method when examining processes that occur with clustering due to location, such as individuals or households within countries. The hierarchical model used in this dissertation is composed of submodels at two levels. The first level is the household. The second level is the

country. This type of model allows for non-independence among respondents who reside within the same country. That is, the model allows for respondents to hold commonalities due to sampling and accounts for the similarities within the model.

Since the outcome variable food insecurity, is recoded as dichotomous, I use multilevel logistic regression. This method predicts the odds of an event occurring, in this case, the odds of food insecurity. An additional benefit of using multilevel modeling is that the intercepts can vary at the household level and country level. The following is an example of the model used. The first model I use, the null model, includes the following components.

$$\log\left(\frac{\pi_{ij}}{1 - \pi_{ij}}\right) = \beta_0 + u_{0j}$$

β_0 is the intercept shared by all countries. The random effect u_{0j} is specific to country ‘j’.

An assumption regarding the random effect is that it follows a normal distribution. A model without any cross-level interactions is represented as

$$\log\left(\frac{\pi_{ij}}{1 - \pi_{ij}}\right) = \beta_0 + \beta_1 X_{ij} + \beta_2 Z_j + u_{0j}$$

Once again, β_0 represents the intercept shared by all countries. X_{ij} indicates a Level 1 predictor. Z_j indicates a Level 2 (country) predictor. u_{0j} is the random effect included in the model and represents country ‘j’.

For models not including a cross-level interaction, I allowed the probability of food insecurity to depend on the country of residence in addition to individual characteristics. This makes the assumption that the effects of individual characteristics are the same in each country or that they are fixed across countries. In models with cross-level interactions, I allow both the coefficient of one of the explanatory variables to vary randomly across countries. For example, in the following model from Chapter 3 found in Table 3.3, Model 4, I allow household income to vary across countries. The following is a shortened version of the equation.

$$\log\left(\frac{\pi_{ij}}{1 - \pi_{ij}}\right) = \beta_0 + \beta_1 \text{Income}_{ij} + \beta_2 \text{GDP}_j + \beta_3 \text{Income} \times \text{GDP}_{ij} + u_{0j} + u_{1j} \text{income}_{ij}$$

In addition to the other variables from the previous model, for example, $\beta_1 X_{ij}(\text{income})$, $\beta_2 Z_j(\text{GDP})$ and the error term u_{0j} this model also incorporates the interaction term $\beta_3 \text{Income} \times \text{GDP}_{ij}$ and an additional error term $u_{1j} \text{income}_{ij}$.

Food insecurity is contextual. By using the multilevel modeling technique, I can examine households while simultaneously adding country-level variables. Multilevel regression allows us to understand how much of food insecurity reflects household-level variation and how much reflects country-level variation, and how these interact. For instance, models can incorporate variables to understand if poor households within high-GDP countries experience food insecurity differently compared to poor households in low-GDP countries.

CHAPTER 3: A CROSS-NATIONAL EXAMINATION OF COUNTRY CONTEXT, FOOD INSECURITY, AND DEVELOPMENT

Introduction

Despite a global food surplus, many people are hungry due to an unequal distribution of food (Clapp 2014). About one in nine people in the world experience food insecurity, meaning that they do not have enough food to have a productive life (wfp.org 2018). Persistent food insecurity is associated with a range of negative consequences, including increased illness, lowered productivity and a higher likelihood of death (Chary et al. 2013; Jha 2009).

A main focus in the sociology of development literature is the role of economic integration in development. Several studies find that foreign direct investment (FDI) aids in economic growth and benefits residents of the receiving country (Ben Slimane et al. 2016; Brady et al. 2007; Firebaugh 1992; Firebaugh and Beck 1994). However, others find that FDI is linked to increased inequality (Dixon and Boswell 1996). Studies examining GDP overwhelmingly find a positive relationship between GDP and indicators of well-being, including food insecurity (Austin et al. 2012; Brady et al. 2007; Burroway 2017; Clark 2011; Denny et al. 2017; Filmer and Pritchett 1999; Firebaugh and Beck 1994; Jenkins and Scanlan 2001; Kick et al. 2011; Noble and Austin 2016).

Some researchers have emphasized how household characteristics predict food insecurity. Household income and food insecurity are linked (Babatunde et al. 2008; Belachew et al. 2012), although scholars note wealthier households can also be food insecure (Simister 2009). Additionally, mothers' education is associated with better nutritional status of children (Imai et al. 2014). Both mothers with higher-than-average levels of education and those with lower-than-average levels of education had children who were more likely to be malnourished (Maddah et

al. 2007). Similarly, another study finds that the odds of food insecurity are lower for mothers with a secondary education, compared to mothers with little education (Schmeer et al. 2015).

Previous research has found that economic integration (measured as FDI or GDP growth) is generally associated with lower rates of food insecurity. However, by focusing on national aggregates (such as the prevalence of food insecurity across a country), development scholars fail to consider how certain types of individuals or households may be more vulnerable to food insecurity. Despite widespread economic growth, 1 in 9 people in the world are still food insecure (wfp.org 2018). I examine how inequalities, particularly related to class, occur both within and between countries. My research addresses this gap by using a multi-level model that combines household and country-level variables.

Literature Review

Sociologists have long debated whether integration into the world economy improves or hinders the well-being of developing countries. Modernization theorists assert that economic and political connections with other countries facilitate development through inflows of capital, increases in technology and advancement of human capital (Rostow 1960). Dependency theorists contend that developed countries exploit developing countries through uneven trade (Chase-Dunn 1975; Gunder Frank 1966).

One specific body of research focuses on foreign direct investment (FDI) as an indicator of integration within the global economy. In support of modernization theory, some studies find that foreign investment aids economic growth in developing countries (Ben Slimane et al. 2016; Brady et al. 2007; Firebaugh 1992; Firebaugh and Beck 1994). Others, in support of dependency theory, demonstrate that foreign investment is linked to increasing inequality (Dixon and Boswell 1996) and higher infant mortality rates (Wimberley 1990).

Some studies focus on GDP per capita as an indicator of economic integration. Previous research finds that GDP reduces mortality rates (Filmer and Pritchett 1999), has positive effects on life expectancy (Brady et al. 2007; Clark 2011), and is related to decreases in malaria rates (Noble and Austin 2016).

Other studies look specifically at the relationship between economic integration and food insecurity. Research on food insecurity and FDI has contradictory results. On the one hand, some studies show a positive relationship between total FDI and average calories per capita (Brady et al. 2007). However, examination of FDI on a sector-by-sector basis yields conflicting outcomes. One study finds that investment in agriculture, a primary sector, is associated with a direct increase in food security, whereas inflows in the form of secondary (manufacturing) and tertiary (service-sector) FDI increases food insecurity (Ben Slimane et al. 2016). Conversely, another study finds that whereas FDI in primary sectors reduces food security, foreign investment in the service sector produces mixed but sometimes adverse effects, and foreign investment in manufacturing improves food security (Mihalache-O'Keef and Li 2011).

Within the same vein, studies focus on the relationship between GDP and food insecurity. Most find that GDP is negatively related to the prevalence of hunger across countries (Austin et al. 2012; Brady et al. 2007; Burroway 2017; Denny et al. 2017; Firebaugh and Beck 1994; Jenkins and Scanlan 2001; Kick et al. 2011). This follows the idea of modernization theory, which suggests that economic growth flows out to the general population, thereby creating greater well-being across a country (Firebaugh and Beck 1994).

Sociologists have long been interested in what drives global economic and social change. For decades, the main focus has been on relationships between countries. Both modernization and dependency theory concentrate on relationships between core (or industrialized) and

peripheral (or industrialized) countries. However, more recently, sociologists have pointed to the need to consider social hierarchies within countries based on class, gender, and race or ethnicity. They argue that globalization has created a shift in how inequalities occur and rather than focusing on inequalities between countries, we need to consider how transnational elites gain power at the expense of poor people in a variety of different countries (Robinson 2003). Previously, the majority of the world's poor lived in low-income countries, but now the majority of the world's poor live in middle-income countries (McMichael 2016). This line of thinking argues that the "transnational capitalist class" benefits the most from increases in growth (Robinson 2003). Globalization created new class formations, in which classes such as peasantries and artisans tend to disappear, and new classes linked to the global economy emerge and become dominant (Robinson 2003) We need to examine how inequalities occur within countries and as a result focus on poor people, rather than poor countries. Using food insecurity as my primary outcome, I examine how both country-level relationships and household-level relationships shape food insecurity to contribute to debates regarding the importance of the nation-state in shaping class inequalities.

In sum, previous studies find that that GDP is associated with a decrease in food insecurity and that FDI has mixed results. However, we do not know if GDP and FDI have varying effects by regions within countries or between households, as suggested by the new geography of inequality and critical globalization perspective. Looking at comparisons between countries, Brady et al. (2007)'s longitudinal study of economic development and food security finds that the positive effect of GDP growth on caloric consumption diminishes over time. The authors offer a possible explanation that supports the idea of unequal benefits: the decline could be a result of inequality increasing within a country; in other words, increases in GDP may

benefit upper-income households and not those with lower incomes (Brady et al. 2007). Similarly, other studies indicate that increases in GDP and FDI do not benefit all residents the same and might even lead to increasing inequality (Dixon and Boswell 1996), which could extend to food insecurity. Although these studies hypothesize why these differences might occur, few have tested the hypotheses. This study fills this gap by examining how country-level indicators associated with modernization and dependency theories intersect with individual-level variables to shape the likelihood of food insecurity for households.

Research Questions

This chapter aims to understand how indicators of economic integration relate to household food insecurity outcomes. First, I ask how foreign direct investment at the country level relates to food insecurity at the household level. Previous research demonstrates mixed results; some studies find that increasing FDI reduces food insecurity (Brady et al. 2007), whereas others have found that this varies based on the FDI sector (Ben Slimane et al. 2016; Mihalache-O'Keef and Li 2011). Second, I ask how GDP relates to food insecurity at the household level. Prior research has found a negative relationship between GDP and food insecurity when both are measured at the country level (Brady et al. 2007; Firebaugh 1992), yet we do not know if these relationships vary within countries. Finally, I ask, how might increases in GDP and FDI translate into unequal outcomes for food insecurity within countries. More specifically, do increases in GDP and FDI benefit different income groups differently? Modernization theory would argue that overall, everyone would benefit from increases. The new geography of inequality and critical globalization perspectives would suggest that certain groups within countries would benefit the most from the increases – for example, the wealthy. I hypothesize that although the odds of food insecurity will reduce on average, the rich will benefit unequally.

Results

Baseline and Control Models

Within multilevel modeling, the first step includes estimating the baseline, called the null intercept-only model. The null intercept-only model justifies using a multilevel model (See Table 3.1, Model 1). The intercept indicates that, on average, respondents are significantly more likely to be food insecure.

Next, I fit a model with all of the Level 1 (household) and Level 2 (country) explanatory variables (See Table 3.1, Model 2). The following household-level variables are included in this model: age, age-squared, female, married, and education level of the respondent; whether the household includes children; employment status; and urban household (rural or urban). I find households that are more likely to be food insecure include households in which the respondent is younger, less educated, and single; and households with children or with an unemployed main earner. Age is statistically significant and has a negative curvilinear effect; the odds of food insecurity are higher for younger people and lower for older respondents. Married respondents have about 14% lower odds of being food insecure compared to those who are not married. Compared to respondents with a primary education, the odds of food insecurity for those who hold a secondary education are 34% lower, and the odds of those with a post-secondary education are approximately 60% lower. Households with children have 18% higher odds of being food insecure compared to those who do not have children. In households where the main wage earner is employed, the odds of food insecurity are 36% lower.

The country-level variables included in Table 3.1, Model 2 include the percentage of the country's population that lives in an urban area and the number of agricultural exports as a percentage of merchandise exports. Only the percent of the population that live in urban areas is

statistically significant. For every percent increase in the country's urban population, the odds of household food insecurity are reduced by approximately 3%. The variable agricultural exports is not statistically significant.

Variables of Interest

In Table 3.1, Model 3, I include all of the variables in Model 2 and also incorporate my variables of interest: household income, the country's GDP per capita, and the level of FDI in the country. As expected, household income is statistically significant and negatively related to food insecurity. An increase in income is related to a decrease in the odds of food insecurity (OR=.82, $p < .001$). Supporting prior research (Austin et al. 2012; Brady et al. 2007; Burroway 2017; Denny et al. 2017; Firebaugh and Beck 1994; Jenkins and Scanlan 2001; Kick et al. 2011), the country's GDP per capita is also statistically significant. For each \$1,000 increase in GDP per capita, the odds of household food insecurity decrease by approximately 4%. FDI on its own is not statistically significant.

Level 2 Interactions

Next, I examine the relationship between GDP per capita and food insecurity, to determine how country wealth (GDP) relates directly to and interacts with other indicators of food insecurity. Table 3.1, Model 4 includes all of the variables in Model 3 and adds an interaction between GDP and FDI. The interaction was not statistically significant. These results suggest that the impact of foreign direct investment does not differ based on the GDP of the country. This supports the argument that nation-states play a less crucial role in shaping well-being than in the past. FDI does not play a crucial role on its own (Model 3), and also does not differ according to the wealth of the country. Despite debates regarding FDI's role in

development (Firebaugh 1992; Kentor and Boswell 2003), it appears that GDP plays a more crucial role in improving food insecurity

Cross-Level Interactions

Table 3.1, Model 5 also includes all variables in Model 3 and adds an interaction between GDP and household income. Surprisingly, the interaction is not statistically significant³. In other words, I do not find support for previous studies that suggest that GDP may disproportionately benefit upper-income households compared to households with lower incomes (Brady et al. 2007). Table 3.1, Model 6 adds an interaction between household income and FDI in addition to the variables included from Model 3. The interaction term is statistically significant.⁴ Poorer households in countries with high FDIs have lower odds of food insecurity compared to poor households in countries with low FDIs. Conversely, richer households in countries with high FDIs have higher odds of food insecurity compared to households located in countries with low FDI. In other words, as FDI increases, the odds of food insecurity becomes more similar; benefiting the poor and yielding increased odds of food insecurity for wealthier households (see Figure 3.1.).

Discussion

The goal of this chapter was to examine how development indicators, typically used within cross-national research, affect households differently. Two key findings emerged. First, FDI is not significantly related to food insecurity (see Model 3), despite prior studies that find that increasing FDI is associated with an increase in the average calories per capita (Brady et al.

³ This model was statistically significant when outliers were dropped: Cyprus, Rwanda, Kuwait, and Bahrain.

⁴ This model was not statistically significant when outliers were dropped: Cyprus, Rwanda, Kuwait, and Bahrain.

2007). Other studies have examined more specific types of FDI – agricultural sector, primary, and secondary sector investments – and their relationship to food insecurity (Ben Slimane et al. 2016; Mihalache-O’Keef and Li 2011). Future research should examine these more specific types of FDI to further our understanding of the relationship between outside investments and food insecurity. The significant interaction term in Model 6 (between FDI and household income) reveals that increases in FDI provide benefit poor households, in terms of reducing food insecurity, but increases in FDI actually increase the likelihood of food insecurity among wealthier households. This is opposite to what would be expected based on theories on inequality, especially those arguing that increases in FDI would primarily benefit the transnational capitalist class (Robinson 2003)

Second, my findings build on the debate regarding economic growth and well-being. GDP per capita is statistically significant and negatively related to food insecurity. The finding supports prior literature suggesting that economic gains contribute to lower prevalence of food insecurity when both are measured at the country level (Austin et al. 2012; Brady et al. 2007; Burroway 2017; Denny et al. 2017; Firebaugh 1992; Jenkins and Scanlan 2001; Kick et al. 2011). My findings support the idea that increases in GDP have beneficial effects across populations (Firebaugh and Beck 1994). Surprisingly, the relationship between household income and food insecurity does not change based on the level of GDP of the country, which challenges the idea that economic growth is primarily channeled to those who are already most advantaged (Brady et al. 2007).

In general, my findings support the idea of modernization theory and do not support the new geography of inequality. The finding that GDP per capita has a negative effect on food insecurity is consistent with modernization theory and prior literature on this topic (Austin et al.

2012; Burroway 2017). I also find that the percentage of the population that lives in urban areas is negatively associated with the odds of food insecurity, which also supports the modernization theory. Although I hypothesized that wealthier household would benefit from increases in economic integration measured as GDP and FDI, the opposite was true. Wealthy households did not experience additional benefits from GDP, as I hypothesized. As FDI increased, those in poor households benefited and those in wealthier households experienced increased odds of food insecurity.

The sample requires some consideration concerning these findings. First, the sample is primarily urban (approximately 83% of households). The average urbanization rate for the countries included in my study is approximately 63% suggesting there are a disproportionate number of urban households in the study. This should be taken into account when interpreting the findings. It is important to note that Asian countries, in general, are overrepresented in the sample, and African countries are underrepresented. This might influence the results, since some argue development plays out differently in various regions, with Asia, in particular, representing a potential exception. For example, there has been much discussion over the East Asian Miracle, in which Asian countries successfully and dramatically increased their GDP through support from their governments (Taniguchi and Babb 2009); these trajectories did not play out in the same way in other parts of the world. More specifically, related to food, Asia has had the highest growth in agricultural production since the 1960s followed by Latin America and then Africa (Pretty 2008). Since Asia is overrepresented, my findings may underestimate the likelihood of food insecurity. China and India are both included in my sample, which is important to consider. For the last 20 years, China and India have both experienced massive growth; China's economy has grown each year on average by approximately 9.6% and India's by 6.5% (World Bank

2018). The countries are not weighted based on population, and therefore China and India are not necessarily driving my findings, but it is important to consider the role that these two exceptional countries might play.

CHAPTER 4: A CROSS-NATIONAL EXAMINATION OF FOOD INSECURITY AND HOUSEHOLD LOCATION

Introduction

In general, the global standard of living has increased over the past two centuries. For example, health and education outcomes have improved in many countries, including those that have not experienced a lot of economic growth (Nederveen Pieterse 2010). However, disparities still exist. This idea has been called a development paradox, in which poverty persists and possibly intensifies, even as economic growth increases (McMichael 2016). Some scholars argue that rural areas, in particular, have been left out of improvements associated with economic development. Several studies highlight rural-urban differences across a variety of indicators, including children's nutritional status (Fox and Heaton 2012), infant mortality (Van De Poel, O'donnell, and Van Doorslaer 2009), and subjective well-being (Easterlin, Angelescu, and Zweig 2011).

One indicator of well-being is food insecurity. Cross-national studies attribute a decrease in food insecurity to economic growth (Brady et al. 2007; Jenkins and Scanlan 2001; Kick et al. 2011). However, these studies are not able to examine within-country disparities in food insecurity rates. A large body of household-level research has examined predictors of food insecurity. Many of these studies focus on one particular country or region and provide a nuanced understanding of how certain households—for example, rural households, poor households, and those headed by women – are more likely to be food insecure (Antón 2010; Belachew et al. 2012; Sraboni et al. 2014; Tibesigwa and Visser 2016)

To further understand food insecurity, we need to understand the spatial inequalities that exist within countries. Rural sociologists have long argued for the need of including space in

understanding social and economic issues (Lobao 1996). Some have argued that development programs have anti-rural biases, providing benefits to urban areas while creating detrimental outcomes in rural areas (McMichael 2016). My research uses multilevel modeling to fill this gap by examining how factors related to economic development at the country-level intersect with household-level variables, explicitly focusing on urbanization and rurality, to create differential outcomes both within and among countries.

Literature Review

Rural sociologists have long argued for the need to better incorporate space into our understanding of social and economic inequalities (Lobao 1996). Many sociological theories provide generalized theories of social processes and fail to consider the role of specific locations (Lobao 1996). For example, grand theories attempting to explain modern capitalist development do not account for how economic change creates uneven outcomes both within and between countries (Lobao 1996).

In contrast, sociologists focusing on spatial inequality show how stratification plays out differently in various locales, particularly across urban and rural areas (Lobao 2004). Studies within the field of rural sociology question the assumption of areas within nation-states as being socially and economically homogenous (Lobao and Saenz 2002). Development policies have focused on increasing the number of urban residents by promoting industrialization and economic development in cities and providing social programs for the urban poor, with general disregard for rural areas (McMichael 2016).

Sociologists like McMichael (2016) describe how government and intra-government efforts to promote “development” often create an urban bias. Many of the policies undertaken as part of the Development Project, which predominately took place between the 1940s to the early

1970s (McMichael 2016), equated development with urbanization. The notion of urban bias captures the idea of the systematic privilege of those in urban areas concerning health, education, employment, and food aid. Development policies within this era gave special advantages to urban populations through social programs (including food programs) and public services, often at the cost of rural areas (Binelli and Loveless 2016). For example, Public Law 480 absorbed surplus produce from the United States through food aid and relocated the surplus to developing countries. As a result of the low-cost food from developed countries, farmers in developing countries faced disincentives to remaining agricultural producers (Dixon and McMichael 2015). Although the Development Project occurred over 30 years ago, the effects are long-lasting.

Another perspective, influenced by modernization theory, argues that economic development flows out to the general population, creating greater well-being across the country, including a reduction of food insecurity, in both rural and urban areas (Firebaugh and Beck 1994). At the country level, scholars use urbanization as an indicator of modernization, finding that more urbanized countries have higher calories per capita (Brady et al. 2007), on average, and lower rates of child hunger (Austin et al. 2012). Although we know rates of hunger are lower for urbanized countries, we do not know how the relationship occurs among households in different spaces.

Sociologists argue that rural and urban communities have differing amounts of resources, leading to differences in health and other outcomes (Fox and Heaton 2012; Heaton and Forste 2003; Nolan 2016). For example, rural areas have fewer health care providers, which along with other factors results in adverse outcomes in children such as poor nutrition, stunting, and mortality (Fox and Heaton 2012; Heaton and Forste 2003; Noble and Austin 2016). Urban areas

tend to have better health outcomes, partially due to increased access to sanitation services and clean water (Heaton and Forste 2003; Noble and Austin 2016; Sastry 1997).

Another perspective argues that variations in health and well-being between rural and urban households stem from differences among individuals within those communities, such as education or wealth (Easterlin et al. 2011; Fox and Heaton 2012; Nolan 2016; Smith, Ruel, and Ndiaye 2005).⁵ Many studies suggest that parental education, specifically maternal education, is important for predicting children's health outcomes (Fox and Heaton 2012; Heaton and Forste 2003; Srinivasan, Zanello, and Shankar 2013) and that households in urban areas tend to be better-educated (Nolan 2016).

Another key difference between rural and urban households is access to land; even if a rural household is poor, they may have access to land, and therefore be able to produce their own food, and have a lower likelihood of food insecurity (Belachew et al. 2011; Bronte-Tinkew and DeJong 2004; Hadley, Mulder, and Fitzherbert 2007). Those with wealth, which includes savings, land and physical assets such as dwelling structure, access to electricity and items within the home, are less likely to suffer from food insecurity compared to those with less wealth (Belachew et al. 2012; Bronte-Tinkew and DeJong 2004; Hadley et al. 2007; Tsai et al. 2011). When focusing specifically on land ownership, households with land are less likely to face food

⁵ Prior literature demonstrates that education of heads of household and mothers negatively relate with food insecurity (Antón 2010; Balk et al. 2005; Ben-Davies et al. 2014; Fox and Heaton 2012) Research suggests that individuals with less than high school education are more likely to be severely food insecure within Honduras (Ben-Davies et al. 2014). Others imply that indirectly, education relates to food insecurity through increased opportunities and also an increased knowledge in food production (Antón 2010; Ben-Davies et al. 2014; Olumakaiye and Ajayi 2006). The increase in education may allow some women the opportunity to participate in the formal economy, reducing food insecurity (Ben-Davies et al. 2014). Another study argues that women with more education are more likely to accept new technologies, potentially aiding in easier production and preparation of food, and thereby reducing food insecurity (Olumakaiye and Ajayi 2006).

insecurity than those without land (Nguyen and Winters 2011; Rammohan and Pritchard 2014; Sraboni et al. 2014).

Household income is negatively correlated with food insecurity because people with more economic resources can purchase more food. Previous research suggests that household income may be even more critical for urban households than for rural households, since they may face barriers to growing their own food (Belachew et al. 2012) and may be more vulnerable to prices variations. An increase in prices may limit people's ability to purchase food, thus increasing food insecurity (Maes et al. 2010). Some households cope by increasing the amount of money they spend on food (Martin-Prevel et al. 2012), but this is difficult for households that do not have enough economic resources.

Although extant literature examines how food insecurity occurs among households, fewer studies examine food insecurity from a cross-national perspective, and an even smaller amount examines food insecurity by examining individuals within countries. Prior cross-national research frequently examines urbanization, but often scholars fail to consider how urbanization affects households differently based on their location. Particularly, the impact of urbanization on rural communities remains under-examined. This research tests the theory of urban bias. This theory argues that urban areas would disproportionately benefit from 'development'; development policies focus on urban areas, and increased urbanization and GDP would lead to resources flowing into households in those areas. This study contributes to this research by not only focusing on rural and urban distinctions but also through examining how disparities occur between households within these classifications.

My study examines both levels of analysis simultaneously to understand how country-level variables interact with individual levels to produce varying outcomes concerning food

insecurity. This is necessary since some studies demonstrate that although development could be associated with better average population health, inequalities within countries remain (Beckfield, Olafsdottir, and Bakhtiari 2013).

Research Questions

Based on prior literature, I have developed several research questions and hypotheses. First, does rural or urban location shape household food insecurity? At the household level, studies demonstrate that rural and urban households differ on characteristics such as average income and education (Fox and Heaton 2012; Heaton and Forste 2003; Nolan 2016) in addition to rural areas facing structural constraints such as availability of food and government support (McMichael 2016).

Second, is the role of income different for urban households compared to rural households? Income may matter more to urban households since they are less likely to grow food compared to rural households (Belachew et al. 2012).

Third, do countries' levels of development, measured as GDP per capita and percentage of urbanization, influence the relationship between household location and food insecurity? Prior research suggests that development, measured in terms of increases in GDP and urbanization, generally has positive effects on well-being (Austin et al. 2012; Brady et al. 2007; Firebaugh and Beck 1994; Fox and Heaton 2012; Jenkins and Scanlan 2001; Jenkins et al. 2007; Kick et al. 2011). Based on the theory of urban bias (McMichael 2016), I predict that in more urbanized countries, households in urban areas will be less likely to be food insecure and those in rural households will be more likely to be food insecure.

Results

Baseline and Control Models

Within the multilevel model, the first step includes estimating the baseline, called the null intercept-only model. This justifies using a multilevel model. The intercept indicates that, on average, respondents are significantly more likely to be food insecure than food secure (See Table 4.1, Model 1).

Next, I fit a model which includes the Level 1 (individual) and Level 2 (country) explanatory variables (Table 4.1, Model 2). The following individual-level variables are included in this model: age, age-squared, female, married, and education level of the respondent; whether the household includes children; employment status; household income; and urban household (rural or urban). The findings of the control variables are as expected: those who are more likely to be food insecure include households which the respondent is younger, less educated or unemployed; households with children; and lower-income households. More specifically, age is statistically significant and has a negative curvilinear effect; the odds of food insecurity are higher for younger people and lower for older respondents. Education is associated with food insecurity; compared to respondents with primary education, the odds of food insecurity for those who hold a secondary education are 24% lower, and the odds of those with a post-secondary education are approximately 46% lower. In households where the main wage earner is employed, the odds of food insecurity are 36% lower. Households with children have 12% higher odds compared to those who do not have children. Households with higher incomes are also less likely to be food insecure (OR=.82, $p<.001$), in support of previous research suggesting that income plays a large role in predicting food insecurity (Acquah, Kapunda, and Legwegoh 2016; Belachew et al. 2012; Maes et al. 2010).

Within the same model, I include country-level controls foreign direct investment and percent of agricultural exports. Neither is statistically significant.

Variables of Interest

In Model 3 (See Table 4.1), I include all the variables from Model 2, adding a variable for whether the household is located in a rural or urban area (urban = 1). It is not statistically significant. I also include two additional country-level variables: GDP per capita divided by \$1,000, and the percent of the country's population living in an urban area. GDP per capita is significant; for every \$1,000 increase in a country's GDP, households' odds of being food insecure are reduced by 4% ($p < .01$). This finding supports prior research indicating that increases in GDP per capita significantly predict lower rates of food insecurity (Austin et al. 2012; Brady et al. 2007; Burroway 2017; Denny et al. 2017; Firebaugh and Beck 1994; Jenkins and Scanlan 2001; Kick et al. 2011). The percentage of the country's population living in an urban is not a statistically significant predictor.

Household-Level Interaction

In addition to all of the variables discussed above, Table 4.1, Model 4 includes a Level 1 interaction between household income and whether a household is in an urban area, given my expectation that income might matter more to urban households. Surprisingly, this relationship is not statistically significant.

Cross-Level Interactions

Table 4.1, Model 5 includes the control variables and variables of interest found in Model 3 and adds a cross-level interaction between the percentage of the country's population that lives in an urban area and whether the household is in a rural or urban area. This interaction yields two distinct slopes for rural and urban households (see Figure 4.1). Increased urbanization tends to

reduce food insecurity among urban residents, but increases food insecurity among rural residents.

In Table 4.1, Model 6, I replace the interaction in Model 5 with a separate interaction between GDP per capita and household location. This model also includes all control variables and variables of interest. Surprisingly, the interaction does not yield significant results. This conflicts with the idea of urban bias and the expectation that country-level economic gains (measured as increases in GDP) would disproportionately benefit urban areas at the expense of rural areas.

Discussion

The first goal of this chapter was to understand how development might play out differently in rural and urban locations. My first research question asked if rural and urban households have significantly different likelihoods of food insecurity. Table 4.1, Model 2 incorporates my variables of interest: household location, GDP per capita, and urbanization. I find that rural households are not significantly more likely to be food insecure. Previous studies have found competing results regarding whether rural households (Anríquez et al. 2013) or urban households are more likely to be food insecure (Belachew et al. 2012). In line with these conflicting findings, my research indicates that there is not a clear relationship between household location and food insecurity. Other factors may play a more significant role; studies suggest urban households tend to be better off in terms of education and wealth (Easterlin et al. 2011; Fox and Heaton 2012), which tends to translate into better health outcomes, including food insecurity. Since I controlled for these factors, it may not be the household location, but the other characteristics of households, that play a contributing role.

Second, I examined whether household income had different effects for urban and rural households. Table 4.1, Model 2 demonstrates that household income by itself is statistically significant, but Table 4.1, Model 3 shows that there is not a statistically significant difference between rural and urban households. Table 4.1, Model 4 elaborates on the relationship to include how income interacts with household location. The model is surprisingly not statistically significant suggesting that income does not matter differently for rural and urban households. Prior research has suggested that income might matter more for urban household since they cannot grow their own food (Belachew et al. 2012), but others note the growth of urban agriculture might allow urban households to become more self-sufficient (and less reliant on household income) for their food supply (Gallaher et al. 2013).

The third question I aim to answer is whether “development,” measured in terms of rising GDP and level of urbanization for countries, influences the relationship between household location and food insecurity. The idea that the level of “development” of a country might influence the relationships between household location and food insecurity is partially supported. Although GDP per capita has a positive and significant relationship with food insecurity, rural and urban households are not affected by it differently, as I expected. Prior studies suggest that governments might invest more in urban areas (McMichael 2016), but my research did not support this hypothesis. Although my findings do not support the idea of urban bias when using GDP per capita as an indicator, future studies should examine if other indicators, such as money spent on social programs or food programs specifically, disproportionately benefit urban households. On the other hand, I do find that rural and urban households experience differences based on the level of urbanization of a country. The level of urbanization is not directly related to food insecurity. However, the level of urbanization at the country level shapes the relationship

between urban households and food insecurity. Table 4.1, Model 5 demonstrates two distinct slopes for rural and urban households regarding the effect of urbanization. This relationship indicates that increasing urbanization tends to reduce food insecurity among urban residents, while increasing food insecurity among rural residents. The finding is in contradiction to previous studies that suggest that as modernization occurs, differences between rural and urban households narrow (Easterlin et al. 2011; Fox and Heaton 2012). Instead, this finding lends support to the idea of urban bias, showing that urban areas benefit from more economic development (Binelli and Loveless 2016; McMichael 2016). However, only the interaction between urbanization rate and urban households creates a significant effect; the fact that an interaction effect does not exist between rural and urban households and GDP is surprising and would strengthen this finding. A potential explanation for this finding is the increase in rural-urban migration. Other studies find that migration reduces the socioeconomic gap between rural and urban households, which could extend to explaining my finding that there is no visible effect of “urban bias” on households’ likelihood of being food insecure (Zimbalist 2017).

Conclusion

This research provides evidence contributing to the debate concerning spatial inequality and development. A goal of this research is to better untangle the relevance of nation-states in relation to development outcomes. This chapter demonstrates that nation-states still play an important role. A country’s higher rate of urbanization results in an advantage for urban households. My findings thus support the idea of urban bias, which argues that governments tend to provide urban households with more resources.

This research demonstrates the importance of examining both household- and country-level characteristics. By incorporating household characteristics beyond merely rural and urban

location, we can understand how other markers of stratification change the relationship, especially income. Thinking about food insecurity using a multilevel framework can provide increased avenues for research and policy suggestions. Future research should examine government spending on welfare programs to understand how different types of households, particularly rural and urban households, benefit differently.

CHAPTER 5: A CROSS-NATIONAL EXAMINATION OF FOOD INSECURITY AND WOMEN'S EMPOWERMENT

Introduction

Women are disproportionately responsible for ensuring that their families have adequate food (Olumakaiye and Ajayi 2006). Since women tend to procure food for their households, previous research suggests that the empowerment of women could lead to an increase in allocation of resources toward decreasing food insecurity (Mason et al. 2014; Sraboni et al. 2014). Some cross-national studies have found, for example, that women's rights and equality tend to be associated with lower rates of food insecurity (Scanlan 2004).

Most studies examining food insecurity focus on the household-level. Household studies discuss the relationship between gender empowerment, in the form of women's control over household resources, and household food insecurity (Mason et al. 2014). Studies find that when women have access to resources and autonomy, they are more likely to have children with better health and nutrition (Brunson, Shell-Duncan, and Steele 2009; Cunningham et al. 2015). Although household studies provide specific details of predictors of food insecurity, they tend to only do so within one country.

Cross-national studies have aimed to understand how measures of gender empowerment within countries play a role in food insecurity, considering not only women's legal rights but also proxies such as education parity and contraception rates. Previous research finds that gender discrimination contributes to child hunger (Jenkins et al. 2007; Scanlan 2004). Researchers argue that improving women's status, including legal rights, can contribute to reductions in malaria, HIV, and infant and child mortality (Austin, Noble, and Mejia 2014; Burroway 2015, 2012).

Most prior studies on women's empowerment and gender parity do not consider how household- and country-level factors might interact. To date, only one study (Burroway 2016) has examined both factors together. Burroway (2016) examines how country-level factors influence child malnutrition within developing countries while holding household-level factors constant. However, Burroway (2016) does not look at how country-level factors interact with household characteristics to predict food insecurity. Although Burroway's (2016) research provides insight into how gender empowerment reduces child malnutrition, it does not tell us how institutional inequalities might further disadvantage particular groups of people.

My research examines how rights regarding land ownership, non-land ownership, and access to financial resources at the country-level shape households' likelihood of food insecurity to address this gap. My study makes two contributions to the research on food insecurity. First, it builds on prior multilevel research by examining the intersection between country-level and household-level contributors to food insecurity, specifically focusing on women's empowerment in a cross-national and household context. Second, this study uses a novel measure of food insecurity that is more holistic than previous measures. Rather than focusing on food expenditures or children's nutritional status, I examine a subjective measure of whether a family felt they did not have enough food at any time over the last year. I use multilevel modeling to analyze household food insecurity data collected through the World Value Survey (WVS) along with country-level variables from the World Bank and the Social Institutions and Gender Index (SIGI).

Literature Review

Many scholars and development agencies view women as catalysts for improvement in the well-being of children and other family members (McMichael 2016). Much research has

focused on the idea of gender empowerment or ensuring that women have the same capabilities as men regarding access to land and other resources, availability to financial tools, and having educational parity with men.

Development theorists argued that early development projects did not include women and sometimes resulted in detrimental effects for women. They argued that women needed to be considered in the implementation of development projects (Boserup 1970). The critiques stemming from this perspective inspired new development programs and policies, with many focusing on income-generating ventures for women. Unfortunately, the focus on women was pushed to the margins of development policy (Jacquette and Staudt 2006). Building on early arguments advocating the need to emphasize gender, others called for the “mainstreaming” of women and gender inequalities into development programs (Jacquette and Staudt 2006). Proponents argued that rather than focusing on women specifically and the creation of special projects for women, there was a need for a better understanding of how gender dynamics between both men and women shape development.

There are several reasons why scholars have identified women’s empowerment as a key to improvements in well-being across populations. First, when women own land, they are more likely to make household decisions and also have children who are less likely to be underweight (Allendorf 2007). Second, when women have higher levels of autonomy, children are more likely to have better health and nutrition (Brunson et al. 2009; Cunningham et al. 2015). This might be due to the fact that when women make key decisions compared to men, they are more likely to be socialized to make decisions with their families in mind (Karakaplan, Naufal, and Vargas-Silva n.d.) which reduces food insecurity (Schmeer et al. 2015). When mothers in Nicaragua contributed to the income of their households, the odds of food insecurity were lower

than when their spouse was the main provider (Schmeer et al. 2015). Working and having equal footing with men within the household allows women to control more of the household income, which relates positively to the amount of money spent on food (Schmeer et al. 2015).

Other research examines how women face additional barriers to ensuring food security. Women often lack access to land, which makes it difficult to be successful agricultural producers (Bee 2014; Gladwin et al. 2001). One study demonstrates that women farmers miss opportunities to participate in government programs since they do not own the land they work (Bee 2014). Women also face barriers concerning production itself due to cultural restrictions, including difficulty purchasing, using, and receiving training on new agricultural technologies (Gladwin et al. 2001). Compared to men, women experience challenges accessing capital, cash and credit (Gladwin et al. 2001; Uraguchi 2010). Men's greater access to resources results in higher crop output, higher non-farm income, and higher household income for male-headed households when compared to female-headed agriculture households (Babatunde et al. 2008).

A smaller body of research demonstrates that the likelihood of food insecurity decreases when women have access to resources. Several studies show that women who own farm equipment, including livestock, land, and related materials, are less likely to be food insecure or to have underweight children (Allendorf 2007; Mason et al. 2014; Sharaunga, Mudhara, and Bogale 2016; Sraboni et al. 2014). Also, when women have access and control over finances, their households are less likely to be food insecure and experience an increase in food intake (Kennedy and Peters 1992; Sharaunga et al. 2016).

The relationship between urbanization and gender remains under-examined. On the one hand, urban areas may have social programs that provide increased access to food, supporting the idea of what some have referred to as "urban bias" (McMichael 2016). This perspective argues

that those in urban areas tend to be more food secure due to additional resources government supports. To the contrary, a downside to rapid development, including urbanization, is that it may re-emphasize traditional gender ideologies (Boserup 1970). A cultural clash may occur as a result of development and increased globalization, reinforcing gender disempowerment (Baker and Leicht 2017). In addition, women may benefit from remaining in rural areas, since it might offer more opportunities for agricultural work. Recent research demonstrates that agricultural exports, specifically called nontraditional agricultural exports (NTAE), provide additional avenues for women to participate in agricultural work (Lee 2010). Studies find work in NTAE tend to be gendered and focus on women, as the work is considered labor intensive (Lee 2010).

Most studies investigating gender empowerment and food insecurity adopt a case study framework, focusing on one country. With several exceptions (Burroway 2016; Scanlan 2004), few studies examine the relationship between food insecurity and gender from a cross-national perspective. Among the studies that do, they generally look at how country-level policies and conditions affect the prevalence of food insecurity. However, to understand if patterns found in case studies and qualitative research occur across countries, we need additional cross-national analyses (Bhandari 2017; Burroway 2016).

Several cross-national studies demonstrate a relationship between women's empowerment and health. Researchers find that an improvement in women's legal standing, such as legal rights to own land, property, and access to loans, reduces health problems related to malaria prevalence, HIV prevalence, and infant and child mortality prevalence (Austin et al. 2014; Burroway 2015, 2012). Other studies use indexes to identify women's empowerment, such as the Human Development Index, compared to men, and find that an increase in the ratio decreases the prevalence of child mortality (Scanlan 2004). Measures accounting for the gender

gap in the Human Development Index reveal that higher gender parity improves child hunger and child mortality (Scanlan 2004). National averages for education negatively relate to national averages for food insecurity measured as child hunger (Scanlan 2004) and child malnutrition (Burroway 2016). Some studies examine the relationship between agricultural exports and hunger suggest that exports increase hunger rates (Austin et al. 2012; Wimberley and Bello 1992). One explanation for this relationship would be that those in the Global South export high-value foods at the expense of their own consumption (McMichael 2009).

Although a large body of research examines how women's access to resources reduces food insecurity, only one uses a multi-level framework (Burroway 2016). Insights from research on other topics suggest that country-level and household-level factors might interact in meaningful ways. For example, one study, which examined women's likelihood of maternal health care use, finds that women in poor households in countries with low female literacy rates were almost three times more likely to lack care compared to women in the richest quintiles. But in countries with high female literacy rates, there is no difference between income and the likelihood of receiving care (McTavish et al. 2010). Countries with social institutions more favorable to women may provide additional access and use of household resources for women, resulting in a reduction of food insecurity.

This study contributes to the research by not only examining how respondents' egalitarian gender views relate to food insecurity but also how policies at the country level shape households' likelihood of food insecurity and intersect with other factors such as urbanization rates, GDP, and agricultural exports.

Research Questions

This chapter aims to answer several questions. First, I assess whether egalitarian gender views at the household relate to food insecurity. This serves as a proxy for other indicators of empowerment which suggest that women having more control within the household aids in reducing food insecurity (Mason et al. 2014). Second, I examine if unequal gender laws at the country level relate to household food insecurity. Prior research suggests that gender empowerment at the institutional level contributes to positive well-being outcomes, specifically associated with health and child hunger (Scanlan 2004; Shen and Williamson 1999; Wickrama and Lorenz 2002). Empowering women provides beneficial outcomes that extend beyond women themselves, to their families and communities (Scanlan 2004). Improving women's social status offers benefits including an increase in knowledge, skills, and income which can be applied to improving their own health (Shen and Williamson 1999; Wickrama and Lorenz 2002). Third, I assess whether unequal gender laws moderate the relationship between country characteristics (GDP, urbanization, agricultural exports) and household food insecurity. As others demonstrate, women's status may intersect with other country-level indicators, such as foreign direct investment, in its relationship to well-being (Shen and Williamson 1999). For example, high levels of foreign investment may disrupt women's access to education, health services, and contraceptive use, which then create detrimental effects in terms of women's mortality (Shen and Williamson 1999). Previous research suggests that women who have more rights will benefit from development, measured in terms of GDP, urbanization, and agricultural exports. Finally, I ask whether gender rights at the country level alter the relationship between household characteristics and food insecurity. One previous study demonstrates how rates of female literacy at the country level reduce inequalities at the household level, particularly income differences

when predicting the likelihood of using maternal health care (McTavish et al. 2010). This relationship may extend to other country-level measures such as rights to reduce inequalities at the household level.

Results

Baseline and Control Models

Within multilevel modeling, the first step includes estimating the baseline, called the null intercept-only model (Table 5.1, Model 1). This justifies using a multilevel model. The intercept indicates that, on average, households are significantly more likely to be food insecure than food secure.

Next, I fit a model with all the Level 1 (household) and Level 2 (country) explanatory variables (Table 5.1, Model 2). The following household-level variables are included in this model: age, age-squared, female, married, and education level of the respondent; whether the household includes children; household income; employment status; and urban household (rural or urban). Overall, I find that households are more likely to be food insecure when the respondent is younger, less educated, or unemployed; when they include children; and when they earn lower incomes. More specifically, age is statistically significant and has a negative curvilinear effect; the odds of food insecurity are higher for younger people and lower for older respondents. Education is significantly associated with food insecurity; respondents who hold a secondary education have approximately 24% lower odds of being food insecure than those with primary education, and respondents with post-secondary education have 46% lower odds of being food insecure. Households, where the main wage earner was employed, have 30% lower odds of being food insecure. Households with children have 11% higher odds of being food

insecure compared to those who do not have children. Income relates negatively to food insecurity (OR=.82, $p<.001$).

The country-level control variables in Model 2 include GDP per capita, the percentage of the population that lives in urban areas, amount of foreign direct investment as a percentage of GDP, and the percent of agricultural exports as a percentage of total exports. Of these, only GDP per capita is statistically significant; for every \$1,000 increase in GDP, the odds of food insecurity decrease by almost 4%.

Gender Views at the Household Level

Table 5.1, Model 3 adds egalitarian gender views at the individual level and also includes all of the variables from the previous model. Egalitarian gender views are negatively associated with food insecurity. Households with a respondent with more egalitarian views regarding gender are less likely to be food insecure (OR=.85, $p<.001$).

Gender Laws at the Country Level

Table 5.1, Model 4 incorporates the index for gender laws at the country level and also includes all of the variables from Model 3. The gender laws variable by itself is not statistically significant.

Table 5.1, Model 5 adds in an interaction term between unequal gender laws and urbanization in addition to all the variables in Model 3. The interaction is negative and statistically significant (see Figure 5.1). Urbanization tends to reduce food insecurity in countries with unequal gender laws, whereas urbanization is associated with increases in food insecurity in countries with equal gender laws. This corresponds with the idea that women with equal rights can gain from living in rural areas. For people living in countries where women do not have equal rights, urbanization may be associated with additional resources, such as better education,

sanitation, and water access (Smith et al. 2005). Paradoxically, in countries where women do have equal rights, greater urbanization is associated with an increased likelihood of food insecurity, perhaps because women in these countries are less likely to be self-sufficient in their food supply. A potential explanation for this unexpected relationship is that women in countries with more equal rights and more urbanization might be experiencing a double burden; they participate in household labor in addition to paid labor, making it more difficult to procure food (Chant 2013).

Table 5.1, Model 6 adds in an interaction term between unequal gender laws and GDP per capita, in addition to all the variables included in Model 3. This interaction is not statistically significant. This suggests that GDP plays a similar role for households, whether countries have unequal or equal policies regarding women's rights.

Table 5.1, Model 7 adds in an interaction between unequal gender laws and agricultural exports, in addition to the variables included in Model 3. The interaction is positive and significant (see Figure 5.2). The finding suggests that agricultural exports tend to decrease food insecurity in countries with equal laws and increases food insecurity in countries with unequal laws. A potential explanation for this relationship is that increases in a country's participation in the global marketplace (measured in this case in terms of the level of agricultural exports) exacerbates already established gender inequalities, as others suggest (Shaw 2011). Additionally, women may be able to take advantage of participating in NTAE, which aids in increases in income and therefore food insecurity. Women in countries with unequal gender laws may not be able to take advantage of participating in agricultural export markets. In this case, they would be doubly disadvantaged by an increase in agricultural exports, since this could lead to a shift in

resources (land, labor, capital) away from food production and because women would not be able to benefit from selling export crops.

Cross-Level Interaction

Table 5.1, Model 8 adds in an interaction between gender laws at the country level and household income in addition to the variables in Model 3. The interaction is significant and positive (see Figure 5.3). For households in the first and second income deciles, being in a country with unequal gender rights is associated with lower odds of being food insecure, but this relationship changes at the third income decile. For the other income deciles, (fourth through tenth), income for households in more equal countries have lower odds of food insecurity compared to households in less equal countries. In other words, income reduces the odds of food insecurity for all income categories, but the effect is stronger for households with equal gender laws compared to households without equal gender laws.

Discussion

Findings suggest that indicators of country-level policies regarding gender equality, as well as regarding whether households have egalitarian views of gender, predict the odds of food insecurity. Additionally, gender laws complicate the relationship between food insecurity and indicators of development at the country level.

My first research question aims to assess the relationships between more egalitarian views at the household level and the likelihood of food insecurity. My research finds that households were less likely to be food insecure when the survey respondent expressed more egalitarian gender views. Although this is only a proxy for gender empowerment within the household, it provides evidence that supports prior studies that find that gender empowerment

contributes to better health and nutrition for members of the household, especially children (Brunson et al. 2009; Cunningham et al. 2015).

My second question aims to answer whether policies that promote equal rights are associated with a decreased likelihood of food insecurity at the household level. I created an index that included three different types of rights for women: regarding land ownership, non-land ownership, and ownership of financial resources. On their own, the index at the country level was not significantly related to household food insecurity. This is surprising given that other studies find that countries with more equal policies regarding gender have improved health outcomes regarding malaria prevalence, HIV prevalence, and mortality rates (Austin et al. 2014; Burroway 2015, 2012). It is possible that the effect only emerges for the most disadvantaged households or countries. For example, egalitarian gender policies may have an effect on food insecurity primarily in households with low education or income rates, or in countries with high dependence on agriculture or low GDP.

My third question focuses on how gender rights might moderate the relationship between country characteristics (their level of urbanization, reliance on agricultural exports, GDP) and food insecurity at the household level. I find that gender rights play an important role in shaping the strength of country characteristics. First, I examine how urbanization and policies regarding equal rights relate to food insecurity. I find that more urbanized countries with unequal gender laws have households with lower odds of food insecurity and households in countries with equal gender laws have higher odds of food insecurity. This relationship conflicts with what would be expected based on theory. Scholars would argue that modernization and equal rights would go hand and hand (Scanlan 2010). However, this is not the case. An increase in urbanization benefits those in unequal countries and disadvantages those in equal countries. This finding may

indicate that urbanization does not fit as neatly with modernization theory as suggested. An alternative explanation for highly urbanized countries with unequal ownership countries is that cities create additional avenues for acquiring food, even if women do not have as many rights. For example, more urbanized countries may provide easier access to education, sanitation and water access, which may help women when countries have unequal gender policies.

Agricultural exports also have different effects on odds of household food insecurity, depending on whether households are in countries with equal or unequal laws. The gap between odds of food insecurity are small with low percentages of agricultural exports, but the difference increases as the percentage of agricultural exports increases, creating high odds of food insecurity for households in the most unequal countries. This relates to prior research suggesting that exports of agricultural products lead to lower economic welfare and greater inequality (Gissinger and Gleditsch 2015), but this also implies that this relationship might be more powerful for households in countries with unequal gender policies. A potential explanation is that women in countries with equal gender laws may have some opportunities to participate in the market, particularly surrounding agriculture, and use those funds toward the well-being of their families, including food purchases (Allendorf 2007; Schmeer et al. 2015).

The last question centers on if unequal gender rights at the country level alter the relationship between household characteristics, explicitly examining household income and food insecurity. Lower-income households in countries with equal gender laws are more vulnerable to food insecurity compared to low-income households in countries with unequal gender laws. This is surprising and not the direction we would expect based on prior research suggesting that gender empowerment at the country-level reduces adverse effects of income differences (McTavish et al. 2010). However, this is only true for those in the first and second decile, and

then for higher-income households, those in countries with unequal rights have higher odds of food insecurity compared to those with more equal rights.

Future research should explore other dimensions of gender inequalities. One crucial aspect that research identifies includes political representation of women (Swiss, Fallon, and Burgos 2012)

Conclusion

This research provides additional information contributing to the debate concerning gender empowerment, development, and food insecurity. It also contributes to the main debate regarding the importance of nation-states. This chapter demonstrates the importance of nation-states since they hold the ability to create and maintain laws pertaining to women's rights, which are in turn linked to food insecurity.

The findings regarding agricultural exports are especially interesting and require additional research. Agricultural exports, which have previously been identified as detrimental to well-being, are especially harmful to households in countries where women and men do not have equal rights. Future research should continue to examine how agricultural exports relate to household well-being, focusing on factors such as women's participation in the labor market or legislative representation.

CHAPTER 6: CONCLUSION

This dissertation's goal was to determine if differences in well-being emerge primarily from differences between countries, as cross-national studies have assumed, or within countries, as more recent theories argue. I examined this debate by focusing on a specific indicator of well-being: access to food. I examine what factors, both from a macro (country-level) and micro (household-level) point of view, predict food insecurity. I also study how country-level characteristics shape households' likelihood of food insecurity. First, I find that GDP per capita is associated with decreased odds of households' food insecurity. This supports one of the basic tenets of modernization theory, the idea that economic growth at the country level "trickles down" to improve the lives of most people living in the country (Firebaugh and Beck 1994). On the other hand, FDI is not related to food insecurity at the household level. FDI may provide beneficial effects for some countries and households and detrimental consequences for others. This is consistent with the contradictory findings in previous studies (Ben Slimane et al. 2016; Brady et al. 2007; Mihalache-O'Keef and Li 2011).

Second, I examine differences between rural and urban households to explore previous arguments that nation-states are not homogenous and do not develop evenly within countries. Although sociologists have emphasized how space plays a role in social life, especially regarding food insecurity, this study does not find a difference between rural and urban households in predicting the odds of food insecurity. A potential explanation for this finding is that household location is not what matters but rather, differences in education and wealth drive the relationship (Fox and Heaton 2012; Heaton and Forste 2003; Nolan 2016; Srinivasan et al. 2013). Although the variable for whether a household is in an urban or rural area is not statistically significant on its own, I find that it matters in combination with other variables. I find partial support for urban

bias (Binelli and Loveless 2016; McMichael 2016) since households in urban areas benefit more once countries become more urbanized. Urban bias would suggest that urban households would gain more from GDP increases, which is not the case. Changes in the composition of urban areas may explain this difference. Others find that internal migration from rural to urban areas reduces the income gap between rural and urban households (Zimbalist 2017). The increase in migration creates more slums, reducing the income gap and contracting the theory of urban bias.

Third, I look at how countries' policies concerning equal gender rights (land ownership, non-land resources, financial resources) and respondents' egalitarian gender views are related to households' likelihood of food insecurity. Much of the literature on development emphasizes the role that women play in reducing household food insecurity, especially regarding children. I find that households in which the respondent expressed more egalitarian gender views, a proxy for the household's level of "gender empowerment," are less likely to be food insecure. This supports prior research which found that gender empowerment aids in the reduction of food insecurity (Allendorf 2007; Mason et al. 2014). In countries with more equal laws, households in less urbanized countries have lower odds of food insecurity compared to households in more urbanized countries. We find the opposite direction when we look at countries with less equal laws. In countries with unequal laws households have higher odds of being food insecure in less urbanized countries compared to households in more urbanized countries. One potential explanation is that increased urbanization creates additional avenues for acquiring food, even if women do not have as many rights. This explanation needs to be further examined through additional research. I also suggest that we need further theorization for why this relationship may exist; additional country-level factors not included in this model could be driving the relationship. Case studies conducted at the household level in countries with high urbanization

and unequal ownership policies could also provide a more complete picture. Agricultural exports interact with gender-related policies; households in countries with lower percentages of agricultural exports are similar regarding odds of food insecurity, regardless of gender rights. In countries where agricultural exports are higher, households in countries with unequal policies have higher odds of being food insecure than households in countries with equal policies. I suggest a potential explanation, although it requires further examination. High agricultural exports combined with unequal policies decrease households' access to food since women do not have access to the capital involved in the production and sale of agricultural exports. On the other hand, in countries with equal laws, households ultimately benefit from exports, since women have the ability to control resources and can use the resources to buy food. Finally, I find that GDP plays a much larger role in lowering the odds of food insecurity for households in unequal countries. This suggests that increases in GDP could reduce the adverse effects of unequal policies for women.

In general, my research lends partial support for modernization theory. Chapter 3 demonstrates that modernization theory via growth occurs, with increases in GDP per capita contributing to a reduced likelihood of food insecurity. Increases in GDP per capita can aid food insecurity in two ways: first, through increases to available resources including household income (Wimberley and Bello 1992) and second, through an increasing revenue base which then builds government safety nets (Ha 2015). Contrary to others' predictions (Brady et al. 2007; Robinson 2003), I do not find that an increase in GDP benefits rich and poor households differently. My findings support the idea that the benefits of increased economic growth benefit the population as a whole (Firebaugh and Beck 1994). My findings contradict the idea of the new geography of inequality, which argues that differences within countries matter more than

differences between countries (McMichael 2016). My findings from Chapter 4 demonstrate partial support for modernization theory and do not support the decreasing importance of the nation-state. I find that GDP per capita does not unequally benefit urban households over rural households. Conversely, for households in urban areas, an increase in urbanization rate lowers the odds of food insecurity. This finding is in contradiction to modernization theory, but instead supports the idea of urban bias. A potential explanation for this finding is that policies supporting increases in urbanization benefit urban households disproportionately (McMichael 2016).

Interestingly, Chapter 5 complicates prior conclusions regarding modernization theory. Modernization theory suggests that social changes occur along with economic changes (Rostow 1960). However, increases in both GDP and urbanization rate reduce the odds of food insecurity for households in countries with unequal gender laws, compared to households in countries with equal gender laws. This finding identifies a potential tension regarding modernization theory, which tends to posit that economic and social changes occur simultaneously and in the same direction. In this case, increases in GDP reduce the odds of food insecurity for all countries (whether they have equal or unequal rights) but the benefits are greater for households in countries with unequal rights. Regarding the role urbanization, the effect is opposite of what I expected; urbanization decreases the odds of food insecurity for households in countries with unequal laws and increases the odds of food insecurity in households in countries with equal laws.

In comparison to previous research, this study is characterized by several differences concerning methods and data. First, instead of focusing on developing or undeveloped countries, as some other studies have done, this study includes a wide range of countries (e.g. Jenkins and Scanlan 2001). Including wealthier countries allows us to examine relationships across a range of

countries, rather than just focusing and generalizing to developing countries. Food insecurity remains an issue for more affluent, including the United States, and this study can help illustrate whether processes occur differently based on countries' wealth. Unfortunately, the data used in this dissertation has missing countries. Due to this missingness, we cannot generalize beyond countries within the scope of the research. The countries themselves do include representative samples of respondents, which provides the opportunity to generalize to the countries as a whole. Second, this research uses a subjective measure of self-reported household food insecurity, rather than an objective measure such as average calories per capita (Brady et al. 2007) or child anthropometric metrics (Nolan 2016). Others demonstrate that experience-based food insecurity measures put households' experiences at the center of the definition of food insecurity in addition to producing valid, cross-national comparable measures (Cafiero et al. 2014). The measure of food insecurity used in this study may help explain why there are discrepancies compared to prior studies but examining food insecurity from multiple perspectives can provide a more complete understanding of the situation.

I have several suggested avenues for future research. First, future research needs to incorporate more countries and aim to be more representative of all of the regions. The WVS continues to collect data, and this can hopefully be accomplished with the next wave of data. Including more countries would allow for a more complete picture of our current food insecurity situation. Including more representation of all regions would also contribute to helping understand how the processes that contribute to food insecurity may differ for various areas of the world due to latent factors that may not appear in current studies. For example, regional differences may occur due to historical legacies that have not yet been determined or cannot be measured with quantitative data but could be illuminated in studies that use more countries.

Second, future research should further investigate different types of measures of gender equality, including democratic representation. Other studies demonstrate that women's democratic representation aids in health outcomes (Swiss et al. 2012), which might also extend to food insecurity. Beyond the inclusion of more indicators of gender inequality, I also argue that we need to further understand the underlying factors for my findings regarding countries with unequal policies concerning gender, especially regarding the role of urbanization. It was surprising to find that increased urbanization reduced the odds of food insecurity for households in countries with unequal policies, yet increased urbanization increased the odds of food insecurity for households in countries with equal policies. Future research could examine additional indicators such as the size of the social safety net and the presence of non-governmental organizations, including organizations centered on food assistance and healthcare. They may play a more dominant role in more urbanized countries and provide additional support to household's experiencing food insecurity, especially in countries where policies do not offer equal opportunities for women.

This research has some limitations, which I want to discuss. First, I am limited by secondary data and the pre-existing variables. In particular, it would have been useful to have specific information regarding the head of household, but this does not exist within this dataset. For example, much of the prior research focuses on and the gender education of the head of household. This is not possible with this data since the respondent is a person in the household, not a head of household. It would also be useful to have additional variables regarding food insecurity, such as those included in the Household Food Insecurity Access Scale (HFIAS). It would provide a more holistic understanding of many aspects of food insecurity including exploring multiple pillars of food insecurity as defined by the World Food Programme.

Second, I am limited by the number of countries included in this study. Some World Bank data reports on approximately 200 countries, yet the wave of the WVS that has my outcome variable only consists of 60 countries, and after missing data, my research incorporates 42 countries. When comparing the countries included in the sample versus the global average, my sample has a higher GDP, a higher percentage of urban citizens, and a smaller percentage of food imports. The sample also includes a larger share of Asian countries (25 out of 49 Asian countries) than countries from other regions (10 out of 54 African countries; 10 out of 46 Latin American countries; 11 out of 37 European countries; 2 out of 19 Oceania countries). The sample is biased toward Asian countries, and as a result, my findings may underestimate the odds of household food insecurity. Asian countries have experienced a lot of growth in recent years, both economically and in agriculture more specifically, which may affect the factors driving household food insecurity compared to other regions (Pretty 2008; World Bank 2018). Out of three regions, Latin America also has a high amount agricultural production, and Africa has the lowest (Pretty 2008). These caveats should be taken into consideration when interpreting my findings.

This research provides insights into how development plays out differently within and between countries and how a variety of factors shapes food insecurity. This research also demonstrates the importance of taking a multilevel approach to understanding food insecurity. Household- and country-level factors both shape food insecurity, and in some cases in interacting and surprising ways.

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Table 2.1: Countries Included in Sample

2011	Armenia, Azerbaijan, Belarus, Chile, Cyprus, Estonia, Kazakhstan, Kyrgyzstan, New Zealand, Nigeria, Russia, Slovenia, Sweden, Ukraine, Uruguay	15
2012	Australia, China, Colombia, Ghana, India, Iraq, Malaysia, Mexico, Netherlands, Peru, Philippines, Poland, Romania, Rwanda, Zimbabwe	15
2013	Algeria, Ecuador, Germany, Lebanon, South Africa, Thailand, Tunisia	7
2014	Bahrain, Brazil, Georgia, Jordan, Kuwait	5
Total		42

Table 2.2: Descriptive Statistics for Chapters 3 & 4 Analytic Sample

	Freq	Percent		
<u>Food Insecure</u>				
Food Secure	23501	59.56%		
Food Insecure	15958	40.44%		
<u>Education</u>				
primary	8453	21.42%		
secondary	21572	54.67%		
post-secondary	9434	23.91%		
<u>Sex</u>				
Male	16447	41.68%		
Female	23012	58.32%		
<u>Marital Status</u>				
Single	15120	38.32%		
Married	24339	61.68%		
<u>Employed</u>				
Unemployed	9661	24.48%		
Employed	29798	75.52%		
<u>Children</u>				
No children	12799	32.44%		
one child or more	26660	67.56%		
<u>Urban Household</u>				
Rural	6538	16.57%		
Urban	32921	83.43%		
	Mean	SD	Min	Min
Age	39.43	16.22	16	98
Income	4.84	2.12	1	10
FDI	2.61	11.62	-79.74	28.92
Ag Exports	2.55	2.43	.012	10.84
GDP (per \$1,000)	16.21	13.20	1.51	73.51
Urbanization	62.71	18.44	26	98
<i>N</i>	39459			

Table 2.3: Descriptive Statistics for Chapter 5 Analytic Sample

	Freq	Percent		
<u>Food Insecure</u>				
Food Secure	21,996	59.21%		
Food Insecure	15,156	40.79%		
<u>Education</u>				
primary	7,846	21.21%		
secondary	20,321	54.70		
post-secondary	8,985	24.18%		
<u>Sex</u>				
Male	15,509	41.74%		
Female	21,643	58.26		
<u>Marital Status</u>				
Single	14,190	38.19		
Married	22,962	61.81		
<u>Employed</u>				
Unemployed	8967	24.14%		
Employed	28,185	75.86%		
<u>Children</u>				
No children	12,057	32.45%		
one child or more	25,095	67.55%		
<u>Urban Household</u>				
Rural	6,134	16.51%		
Urban	31,018	83.49%		
	Mean	SD	Min	Min
Age	39.21	16.06	16	98
Income	4.84	2.11	1	10
FDI	2.54	11.68	-79.74	28.92
Ag Exports	2.57	2.41	.012	10.84
GDP (per \$1,000)	15.78	12.96	1.51	73.51
Urbanization	62.11	18.46	26	98
Gender Rights	1.80	1.48	0	5
<i>N</i>	37,152			

Table 3.1: Odds Ratios for Logistic Regression Analysis for Chapter 3

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Level 1 Variables						
Food Insecure						
Age		1.014 (1.82)	1.011 (1.41)	1.011 (1.41)	1.010 (1.31)	1.010 (1.31)
Age-squared		1.000** (-2.77)	1.000* (-2.47)	1.000* (-2.47)	1.000* (-2.50)	1.000* (-2.50)
Female		0.995 (-0.14)	0.990 (-0.26)	0.990 (-0.26)	0.992 (-0.20)	0.992 (-0.20)
Married		0.868* (-2.42)	0.904 (-1.83)	0.904 (-1.83)	0.916 (-1.59)	0.916 (-1.60)
Secondary		0.667*** (-5.08)	0.760*** (-3.54)	0.760*** (-3.55)	0.731*** (-4.15)	0.731*** (-4.15)
Postsecondary		0.411*** (-10.04)	0.535*** (-7.54)	0.534*** (-7.55)	0.524*** (-7.86)	0.524*** (-7.86)
Child		1.184** (2.68)	1.122 (1.78)	1.122 (1.78)	1.118 (1.72)	1.119 (1.73)
Urban Household		1.070 (0.53)	1.140 (1.01)	1.141 (1.02)	1.143 (1.10)	1.143 (1.10)
Employed		0.636*** (-5.71)	0.712*** (-4.75)	0.712*** (-4.75)	0.748*** (-3.89)	0.747*** (-3.90)
Household Income			0.817*** (-9.50)	0.817*** (-9.50)	0.786*** (-4.66)	0.769*** (-9.69)
Level 2 Variables						
Urbanization		0.974** (-3.14)	0.995 (-0.48)	0.995 (-0.53)	0.997 (-0.29)	0.997 (-0.29)
Agricultural exports		1.021 (0.49)	1.011 (0.27)	1.014 (0.35)	1.008 (0.20)	1.008 (0.20)
GDP			0.960** (-2.66)	0.970 (-1.95)	0.960** (-3.51)	0.957*** (-3.41)
FDI			0.999 (-0.18)	1.074 (1.72)	0.996 (-0.72)	0.986** (-2.76)
GDP x FDI				0.998 (-1.78)		
Cross-Level Interactions						
Household Income x GDP					0.999 (-0.28)	
Household Income x FDI						1.003* (2.37)
Constant	1.032* (2.16)	4.469* (2.42)	5.401** (2.67)	4.070* (2.03)	6.060** (2.65)	6.560** (2.86)
Level 2 variance	13.447*** (3.78)	2.635*** (4.78)	2.228*** (3.82)	2.164*** (3.72)	3.154*** (3.42)	3.121*** (3.43)
Level 1 Variance					1.029*** (3.90)	1.028*** (3.78)
Covariance (income, country)					0.900* (-2.11)	0.903* (-2.07)
N	39459	39459	39459	39459	39459	39459
Pseudo Log Likelihood	-23561.900	-22353.334	-21779.296	-21778.504	-21567.649	-21566.930

Exponentiated coefficients; *t* statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4.1. Odds Ratios for Logistic Regression Analysis for Chapter 4

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Level 1 Variables						
Food Insecure						
Age		1.011 (1.38)	1.011 (1.41)	1.011 (1.39)	1.012 (1.52)	1.011 (1.45)
Age-squared		1.000* (-2.46)	1.000* (-2.47)	1.000* (-2.45)	1.000* (-2.54)	1.000* (-2.49)
Female		0.992 (-0.21)	0.990 (-0.26)	0.990 (-0.27)	0.993 (-0.19)	0.991 (-0.23)
Married		0.905 (-1.82)	0.904 (-1.83)	0.905 (-1.83)	0.905 (-1.82)	0.904 (-1.85)
Secondary		0.762*** (-3.48)	0.760*** (-3.54)	0.761*** (-3.56)	0.767*** (-3.50)	0.768*** (-3.44)
Postsecondary		0.539*** (-7.20)	0.535*** (-7.54)	0.536*** (-7.62)	0.543*** (-7.57)	0.543*** (-7.48)
Child		1.123 (1.79)	1.122 (1.78)	1.121 (1.78)	1.123 (1.83)	1.130 (1.86)
Employed		0.705*** (-4.90)	0.703*** (-4.98)	0.703*** (-4.98)	0.705*** (-4.92)	0.704*** (-4.92)
Household Income		0.818*** (-9.33)	0.817*** (-9.50)	0.836*** (-6.53)	0.815*** (-9.71)	0.814*** (-9.73)
Urban Household			1.140 (1.01)	1.290 (1.25)	3.757*** (3.46)	1.288 (1.25)
Level 2 Variables						
FDI		1.004 (0.43)	0.999 (-0.18)	0.999 (-0.18)	1.024 (1.67)	1.013 (1.21)
Agricultural Exports		1.040 (0.65)	1.011 (0.27)	1.011 (0.27)	0.983 (-1.62)	0.980* (-2.21)
GDP			0.960** (-2.66)	0.960** (-2.66)	0.970*** (-7.77)	0.985 (-1.23)
Urbanization			0.995 (-0.48)	0.995 (-0.48)	1.005 (0.73)	0.982*** (-5.65)
Level 1 Interaction						
Urban Household x Household Income				0.971 (-0.90)		
Cross-Level Interaction						
Urban Household x Urbanization Rate					0.980*** (-3.46)	
Urban Household x GDP						0.994 (-0.71)
Constant	1.054 (0.36)	1.817 (1.86)	5.401** (2.67)	4.915* (2.53)	2.832* (1.98)	10.467*** (6.07)
Level 2 Variance	14.327*** (4.21)	3.414*** (4.65)	2.228*** (3.82)	2.230*** (3.80)	3.326*** (3.45)	2.829*** (3.52)
Level 1 Variance					1.384** (3.00)	1.601** (3.05)
Covariance (urban household, country)					1.206* (2.34)	1.073 (0.57)
N	39459	39459	39459	39459	39459	39459
Pseudo Log Likelihood	-23561.900	-21793.878	-21779.296	-21777.192	-21651.539	-21668.887

Exponentiated coefficients; *t* statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5.1. Odds Ratios for Logistic Regression Analysis for Chapter 5

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Level 1 Variables								
Food Insecure								
Age		1.011 (1.32)	1.012 (1.45)	1.012 (1.45)	1.012 (1.46)	1.012 (1.45)	1.012 (1.45)	1.011 (1.37)
Age-Squared		1.000* (-2.34)	1.000* (-2.46)	1.000* (-2.46)	1.000* (-2.47)	1.000* (-2.46)	1.000* (-2.46)	1.000* (-2.51)
Female		0.992 (-0.21)	1.039 (0.95)	1.039 (0.95)	1.039 (0.95)	1.039 (0.95)	1.039 (0.95)	1.040 (0.93)
Married		0.913 (-1.52)	0.910 (-1.59)	0.910 (-1.59)	0.909 (-1.59)	0.910 (-1.59)	0.910 (-1.59)	0.921 (-1.38)
Secondary		0.758*** (-3.41)	0.778** (-3.19)	0.779** (-3.18)	0.779** (-3.17)	0.779** (-3.18)	0.779** (-3.18)	0.747*** (-3.75)
Postsecondary		0.537*** (-7.29)	0.565*** (-7.19)	0.565*** (-7.18)	0.565*** (-7.16)	0.565*** (-7.18)	0.565*** (-7.19)	0.553*** (-7.38)
Employed		0.697*** (-5.07)	0.699*** (-5.02)	0.699*** (-5.02)	0.699*** (-5.02)	0.699*** (-5.02)	0.699*** (-5.02)	0.734*** (-4.10)
Child		1.108 (1.54)	1.105 (1.47)	1.105 (1.47)	1.105 (1.47)	1.105 (1.47)	1.104 (1.47)	1.101 (1.42)
Income		0.816*** (-9.40)	0.817*** (-9.33)	0.817*** (-9.33)	0.817*** (-9.33)	0.817*** (-9.33)	0.817*** (-9.33)	0.775*** (-9.57)
Urban Household		1.152 (1.12)	1.147 (1.08)	1.146 (1.08)	1.144 (1.06)	1.146 (1.08)	1.146 (1.08)	1.149 (1.18)
Gender Views			0.853*** (-4.41)	0.853*** (-4.40)	0.853*** (-4.41)	0.853*** (-4.41)	0.853*** (-4.40)	0.848*** (-4.51)
Level 2 Variables								
GDP		0.961** (-2.60)	0.961** (-2.70)	0.964* (-2.35)	0.947*** (-4.08)	0.953 (-1.51)	0.958** (-3.17)	0.959** (-3.02)
Urbanization		0.995 (-0.51)	0.996 (-0.43)	0.996 (-0.35)	1.004 (0.46)	0.999 (-0.12)	1.006 (0.51)	0.997 (-0.25)
FDI		0.999 (-0.13)	0.999 (-0.23)	0.999 (-0.33)	0.995 (-1.01)	0.998 (-0.33)	0.998 (-0.38)	0.996 (-0.72)
Agricultural Exports		1.010 (0.25)	1.023 (0.58)	1.027 (0.67)	0.943 (-1.49)	1.014 (0.39)	1.045 (1.05)	1.019 (0.47)
Unequal Gender Laws				1.070 (0.42)	4.887* (2.76)	1.173 (0.64)	0.798 (-1.23)	0.807 (-1.11)
Level 2 Interactions								
Unequal Gender Laws x Urbanization					0.975** (-2.98)			
Unequal Gender Laws x GDP						0.990 (-0.45)		

Table 5.1. Odds Ratios for Logistic Regression Analysis for Chapter 5 (continued)

	Cross-Level Interactions							
Unequal Gender Laws x Agricultural Exports							1.120*	
							(2.34)	
Unequal Gender Laws x Income							1.056*	
							(2.44)	
Constant	1.015 (0.09)	5.563** (2.68)	4.713* (2.40)	4.271* (2.01)	3.433 (1.80)	4.228* (2.02)	2.483 (1.21)	5.635* (2.34)
Level 2 Variance	11.639*** (4.03)	2.244*** (3.89)	2.175*** (3.95)	2.170*** (4.04)	1.966*** (4.06)	2.160*** (3.89)	2.050*** (4.25)	3.133*** (3.58)
Level 1 Variance							1.027*** (3.83)	
Covariance (income, country)							0.904* (-2.24)	
N	37152	37152	37152	37152	37152	37152	37152	37152
Pseudo Log Likelihood	-22118.207	-20534.507	-20469.427	-20469.354	-20466.500	-20469.228	-20467.802	-20266.136

Exponentiated coefficients; *t* statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figures

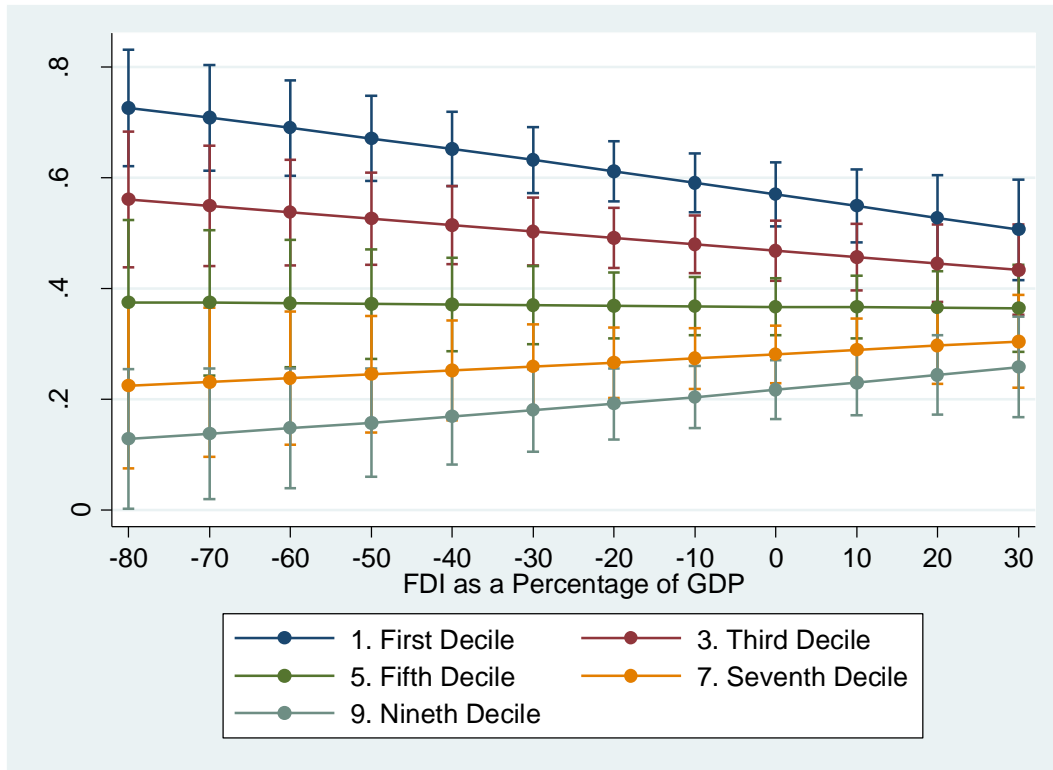


Figure 3.1: Predicted Probabilities of Food Insecurity Based on FDI and Income (Model 6)

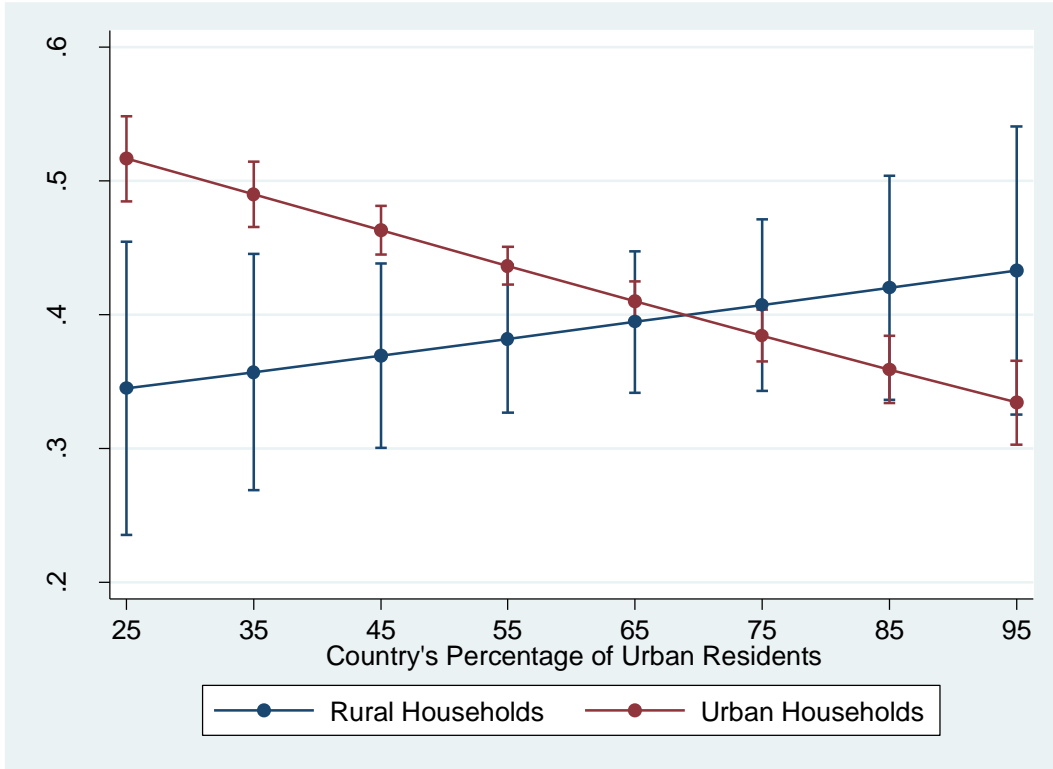


Figure 4.1: Predicted Probabilities of Food Insecurity Based on Urbanization and Urban Household (Model 5)

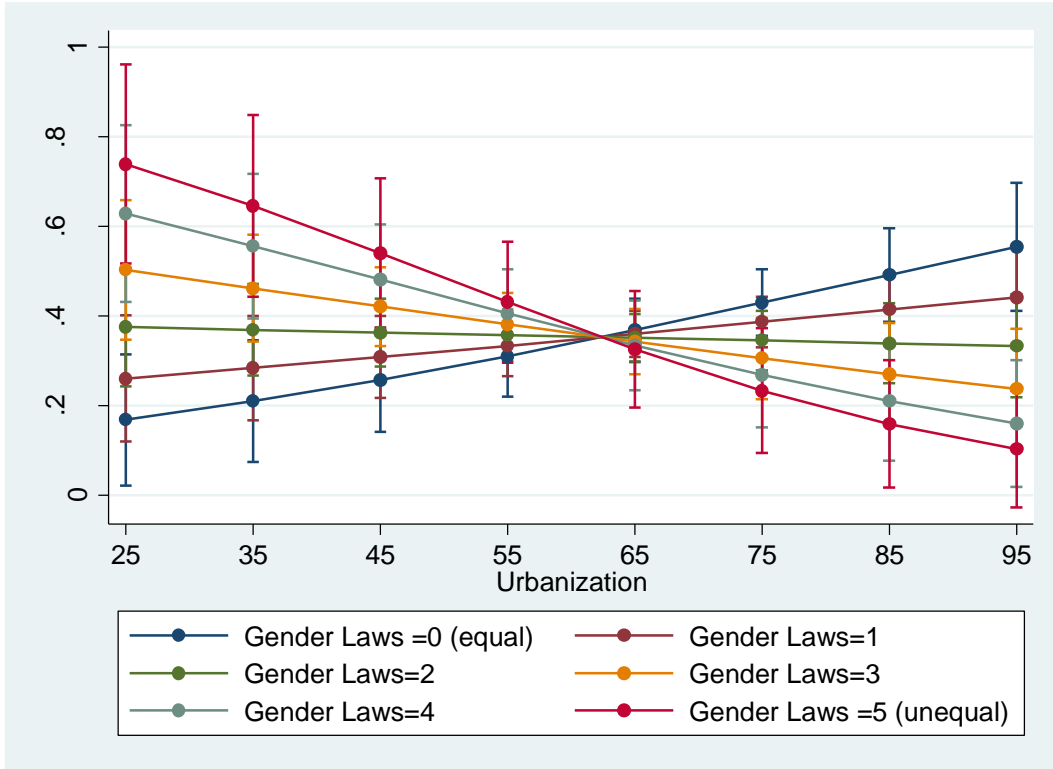


Figure 5.1: Predicted Probabilities of Food Insecurity Based on Urbanization and Unequal Gender Laws (Model 5)

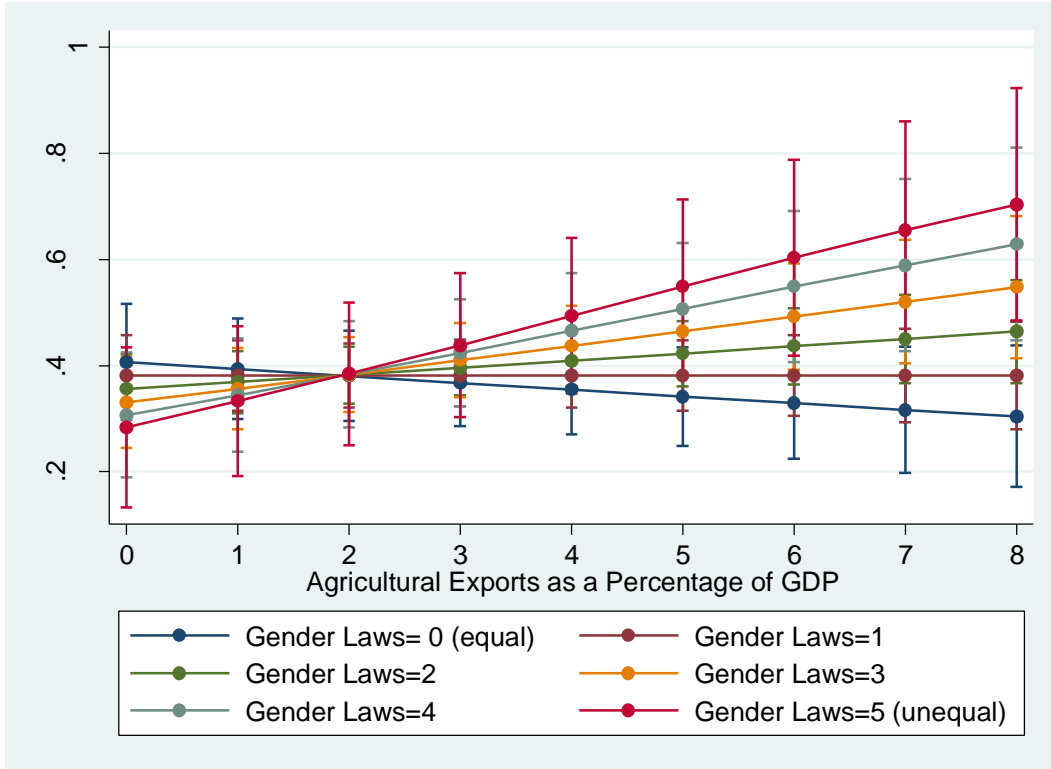


Figure 5.2: Predicted Probabilities of Food Insecurity Based on Agricultural Exports and Unequal Gender Laws (Model 7)

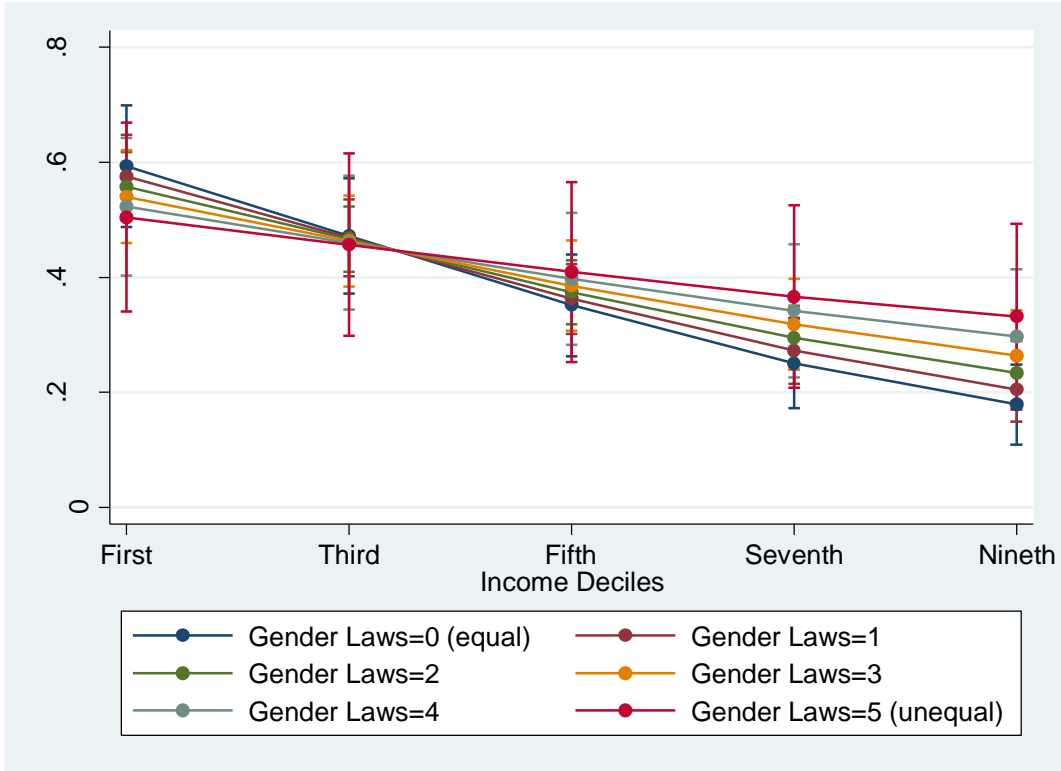


Figure 5.3: Predicted Probabilities of Food Insecurity Based on Income Deciles and Unequal Gender Laws (Model 8)

APPENDIX

Appendix A

Table 1: Pearson's Correlations for Sample Data for Households and Countries

	Food Insecure	Age	Female	Married	Education	Employed	Child	Income	Urban Households	Gender Views
Food Insecure	1									
Age	-0.0589***	1								
Female	-0.0383***	0.0677***	1							
Married	-0.0219***	0.309***	0.119***	1						
Education	-0.129***	-0.187***	-0.0278***	-0.0822***	1					
Employed	-0.108***	-0.195***	0.0122*	0.0229***	0.115***	1				
Child	0.0230***	0.503***	0.196***	0.615***	-0.176***	-0.0438***	1			
Income	-0.173***	-0.133***	-0.0194***	-0.0354***	0.242***	0.134***	-0.119***	1		
Urban Household	-0.0193***	-0.00475	0.0120*	0.0237***	0.0670***	0.0697***	-0.00305	0.0472***	1	
Gender Views	-0.139***	0.0261***	0.162***	0.0236***	0.153***	0.0283***	0.0236***	0.0354***	0.0211***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1: Pearson's Correlations for Sample Data for Households and Countries (continued)

	Urbanization	FDI	Agricultural Exports	GDP per \$1,000	Land Rights	Non-Land Rights	Financial Rights
Urbanization	1						
FDI	0.0147**	1					
Agricultural exports	-0.268***	0.0318** *	1				
GDP per \$1,000	0.656***	-0.140***	-0.211***	1			
Land Rights	-0.504***	0.133***	-0.0251***	-0.659***	1		
Non-land Rights	-0.525***	0.123***	0.0317***	-0.571***	0.761***	1	
Financial Rights	-0.185***	0.0821** *	0.0122*	-0.321***	0.318***	0.249***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Collinearity Diagnostics

Variable	VIF	VIF – Square Root	Tolerance	R-Squared
Food Insecure	1.14	1.07	0.873	0.127
Age	37.60	6.13	0.027	0.973
Age-Squared	34.98	5.91	0.029	0.971
Female	1.08	1.04	0.0929	0.071
Married	1.72	1.31	0.583	0.4147
Education	1.21	1.10	0.829	0.171
Employed	1.10	1.05	0.910	0.090
Child	2.14	1.46	0.468	0.532
Income	1.13	1.06	0.883	0.117
Urban Household	1.03	1.01	0.974	0.026
GDP per \$1000	2.34	1.53	0.428	0.512
Urbanization	2.01	1.42	0.497	0.503
FDI	1.07	1.03	.935	0.065
Agricultural Exports	1.15	1.07	0.872	0.128
Gender Views	1.17	1.08	0.858	0.142
Unequal Gender Rights	1.95	1.40	0.512	0.4876
Mean VIF	5.80			

Table 3: Descriptive Statistics for Full Sample

	Freq	Percent	N		
<u>Food Insecure</u>					
Food Secure	57,179	65.89%			
Food Insecure	29,597	34.11%	86,776		
<u>Education</u>					
primary	20,220	23.17%			
secondary	45,263	51.85%			
post-secondary	21,793	24.97%	87,276		
<u>Sex</u>					
Male	42,310	48.07%			
Female	45,711	51.93%	88,021		
<u>Marital Status</u>					
Single	31,980	36.39%			
Married	55,900	63.61%	87,880		
<u>Employed</u>					
Unemployed	16,493	25.34%			
Employed	48,585	74.66%	65,078		
<u>Children</u>					
No children	25,079	29.00%			
one child or more	61,389	71.00%	86,468		
<u>Urban Household</u>					
Rural	12,937	18.99			
Urban	55,205	81.01%	68,142		
	Mean	SD	Min	Min	N
Age	42.07	16.48	16	98	87,937
Income	4.88	2.12	1	10	85,056
FDI	3.35	10.55	-79.74	28.92	88,112
Agricultural Exports	2.13	2.08	.0002	10.84	83,482
GDP (per \$1,000)	22.31	20.75	1.51	125.09	86,082
Urbanization	65.64	21.27	9	100	88,112
Gender Index	1.53	1.39	0	5	87,053

Table 4: Full Distribution of Dependent Variable, Food Insecurity

	Frequency	Percent	Cumulative Frequency
Often	2,005	5.40%	5.40%
Sometimes	5,767	15.52%	20.92%
Rarely	7,384	19.88%	40.79%
Never	21,996	59.21%	100.00%

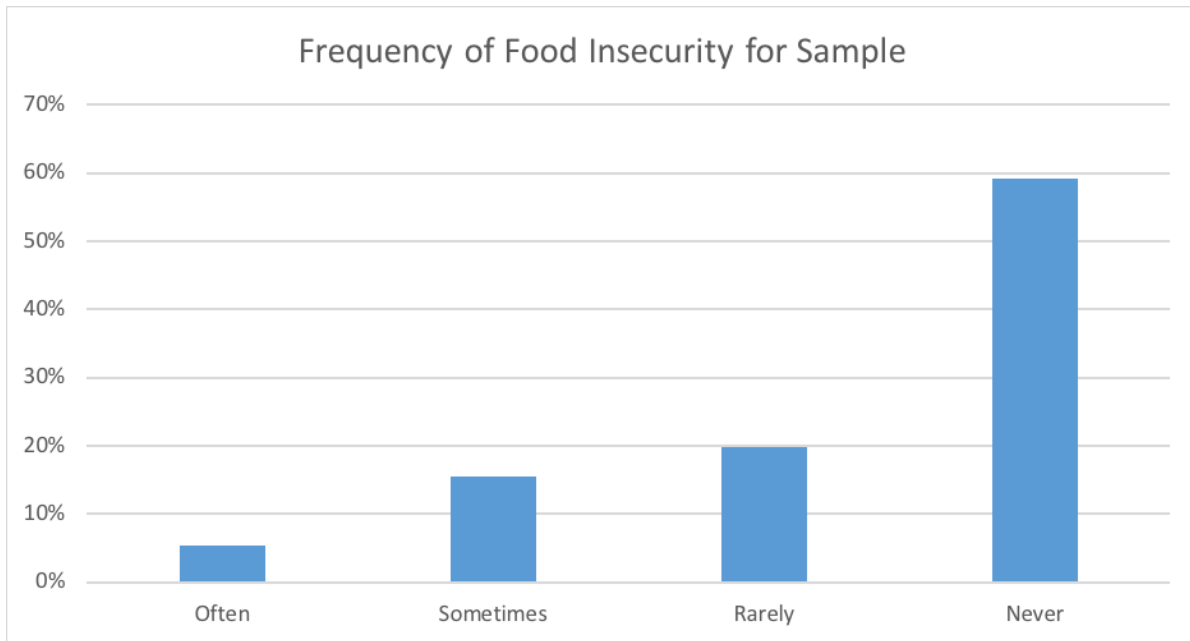


Figure 1: Frequency Distribution of Dependent Variable, Food Insecurity