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TRADE LIBERALIZATION AND CONSUMPTION IN PANAMA: AN EMPIRICAL
ANALYSIS

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ABSTRACT

In this thesis, I aim to explore the relationship between trade liberalization and poverty in Panama. I do this by examining the relationship between tariff reductions on major agricultural goods produced in Panama and food consumption. I begin with an analysis of the specific factors model, and how it relates to the situation in Panama. I hypothesize that a decrease in the weighted average tariff rate on major agricultural goods, as took place in Panama over the time periods examined, will contribute to an increase in food consumption. I continue by employing a statistical analysis. I use data from the Living Standards Measurement Survey (LSMS), conducted in Panama in 1997, 2003, and 2008, in order to conduct this analysis. I also use data on tariff rates from the World Trade Organization and on agricultural production from the Food and Agriculture Organization of the United Nations Statistics Division.

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Chapter 1

Introduction

Globalization has transformed the global economy. States are becoming increasingly open to trade and in turn, increasingly interconnected. Trade liberalization, one of the major components of globalization, has not only transformed the way that states interact with one another, but has altered economic conditions within states. Due to globalization's profound impact on every aspect of life – from economics to politics to job opportunities, from the developed to the developing world – there has been extensive research on the subject. However, to date there is no clear and unquestionable consensus as to the impact of trade liberalization on poverty or inequality. As is further discussed in the literature review, it appears that the impact of trade liberalization on poverty in a specific state is likely dependent on the implementation of trade liberalization policies in that state and on multiple other state-specific factors.

The main objective of this thesis is to examine the relationship between trade liberalization and consumption, as it relates to poverty alleviation. There does not seem to be a hard and fast rule as to whether trade liberalization improves or worsens the situation of the poor. Previous research has found that this relationship is nuanced and likely case-specific. This paper will focus on the relationship between trade liberalization and consumption as it relates to poverty alleviation in Panama. I focus on Panama because it joined the WTO relatively recently, in 1997. At this time, Panama transformed from an economy with high rates of trade protection to one of the most open economies in Central America. At the time of its WTO accession, Panama still suffered from relatively high poverty rates, which were highly concentrated in rural

an indigenous areas (The World Bank 2000). For these reasons, I choose to study Panama in order to determine the relationship between the trade liberalizations that have taken place there and poverty alleviation.

This paper proceeds in six main sections. The second part of this introduction includes background information on Panama's economic conditions, its WTO accession, and presents the research question and the basis for the analysis of this paper. The second section of this paper surveys the literature on the impact of globalization on poverty on a worldwide scale, as well as previous literature that narrowed its focus to developing countries, one country in particular, or specific populations within a country. In the third section, I construct and explain my theory regarding the relationship between food consumption, and average tariff rates on main agriculture products, and employ the specific factors model to build support for my theory. Next, I present the research design, describe the variables, and finally display and interpret the results of the statistical analysis. I end by drawing conclusions based off of the results of the analysis, noting the limitations of this study and making suggestions for future research.

Introduction to the Situation in Panama

In September of 1997, Panama joined the World Trade Organization (WTO). According to the World Bank (2000), Panama historically had extremely high levels of trade distortion. From 1992 to 1997, Panama implemented the Economic Reform Loan. Prior to this program, tariff rates in Panama were as high as 90 percent for manufactured goods, and 800 percent on some basic grains. As late as 1996, Panama still used import quotas and other nontariff barriers to trade, especially on food products. Prior to joining the WTO, Panama also had over 108

different tariff rates. After joining the WTO, Panama transformed into one of the most open economies in Central America within the first 12 months of membership. In December of 1996, and March of 1997, the first round of tariff reforms was implemented, which reduced tariffs and eliminated nontariff trade barriers to member states. The second round of reforms, implemented in July of 1997 further reduced maximum import tariffs on important goods such as wheat products and vegetable oils. As of January 1, 1998 the tariff rate on most other goods was reduced to a maximum of 15 percent (The World Bank 2000).

Also according to the World Bank (2000), the tariff reforms reductions implemented in Panama resulted in the lowest tariff rates on agricultural goods in the region. This is of particular importance to this study, since the aim of this paper is to examine how trade liberalization impacts poverty in Panama. Food consumption accounts for 59 percent of total consumption by the poor, and agriculture accounts for 29 percent of income for the poor. Thus, it is apparent that the tariff rate on food would have important implications for the consumption habits of the poor. Historically, Panama had intervened substantially into the tariff rates for basic agricultural goods such as rice. Rice is a basic food crop and also accounts for a significant amount of Panama's agricultural production, and was thus considered sensitive for the wellbeing of Panama's economy. As late as 1995, the nontariff and tariff trade protections on rice were estimated at a tariff equivalent of 168 percent (The World Bank 2000). In 2008, after the implementation of these trade reforms, the tariff on paddy rice (which is produced in large quantities in Panama) was lowered significantly to 45 percent, according to tariff data from the WTO.

When this study begins in 1997, 37 percent of Panama's population remained below the poverty line, and 19 percent of the population was in extreme poverty. Poverty in Panama also appears to be concentrated in rural areas. In 1997, 58 percent of poverty was concentrated in

rural non-indigenous areas, and 19 percent was located in rural indigenous areas. 95 percent of the population in indigenous areas in 1997 was below the poverty line, while only 15 percent of the urban population lived in poverty (The World Bank 2000). This demonstrates that poverty is highly concentrated in rural and indigenous as opposed to urban areas and thus indicates an inequality between the them.

This paper will attempt to examine the relationship between the tariff rate and food consumption. The purpose of this analysis is to determine the impact of change in the average tariff rate on agricultural goods on food consumption in Panama between 1997 and 2008. This paper uses food consumption to examine poverty, since food consumption accounts for a large proportion of the income of the poor.

Chapter 2

Literature Review

Harrison (2007) studies the linkage between globalization and poverty, using trade and international capital flows as proxies for globalization. This study focuses on globalization on a worldwide scale. Harrison finds that it is an oversimplification to state that globalization should help the poor because the poor have a comparative advantage in sectors that utilize unskilled labor and can therefore export goods that are unskilled labor intense. Rather, Harrison argues that the poor are more likely to benefit from globalization when policies such as investments in human capital and infrastructure, policies to promote credit and technical assistance to farmers, and policies to promote macroeconomic stability. Harrison continues by arguing that the poor are more likely to benefit from globalization working in exporting sectors and sectors that receive foreign direct investment as a result of globalization. Since this demonstrates that the poor can benefit from globalization, but only under certain circumstances, Harrison (2007) draws the conclusion that globalization produces winners and losers among the world's poor. This theme – that globalization benefits the poor in some sectors and in some states, depending on the state-specific policies and economic conditions – proves to be common throughout the literature on the impact of globalization on poverty. This theme will be examined in this paper by attempting to differentiate between the effects of trade liberalizations on urban, rural non-indigenous, and rural indigenous areas.

Similar to Harrison's (2007) study, Winters, McCulloch, and McKay (2004) also study the link between globalization and poverty on a global scale. As will prove to be another

common theme within the literature on globalization and poverty, the authors make note that poverty is not easily measured, and does not necessarily have a clear definition. The authors choose an absolute measure of poverty. While this method is useful due to the fact that this is a relatively simple and straightforward means of measuring poverty, this method has limitations, which could impact the accuracy of the results of this study. Using income versus consumption versus purchasing power as measures of poverty may impact how globalization appears to affect poverty. No clear consensus exists as to which measure is best, and so although this may be a significant limitation to their study, it is important to examine. Winters, McCulloch, and McKay (2004) employ a strictly empirical study, focusing on absolute poverty over inequality. They argue in favor of this method on the grounds that because trade liberalization increases opportunities for economic activity in general, this can easily benefit the rich more so than the poor, thus increasing income inequality. However, it is possible that while the rich are benefitting more from trade liberalization, absolute poverty may still be reduced.

As did Harrison, the authors also find that there is no general conclusion that can be drawn from their study about the link between trade liberalization and poverty. They argue that the empirical evidence in their study broadly supports the theoretical idea that trade liberalization alleviates poverty in the long run and on average. However, they modify this statement by also concluding that trade liberalization is not necessarily the most important factor in reducing or eliminating poverty, and that it is likely that the wellbeing of the poor in some sectors will be reduced due to trade liberalization at least in the short run. As in Harrison (2007), this study demonstrates that there is no clear or simple relationship that can be defined between trade liberalization and poverty. Rather, the link is complicated and nuanced, and will have different implications in different regions and on households in sectors.

Hertel and Reimer (2004) offer a survey of the research on the linkage between trade liberalization and poverty on a global scale. The paper surveys recent studies on trade reform in developed and developing countries impacts the poor in the developing world. One of the conclusions of this study could have important implications for the accuracy of this paper. The authors argue that there are problems with the sampling of household surveys that leads to discrepancies between household survey data and national accounts. They argue that wealthy households are often under-sampled, and income is often under-reported, causing total income reported in household survey data to be far less than reported in national accounts. Under sampling tends to be severe for capital and non-farm sectors as well. This can result in discrepancies between how an economy appears to operate when one looks at household survey data versus national data. This can lead to misleading and inaccurate inferences and conclusions. Given that this study uses household survey data, it is important to note that this data is imperfect and therefore the conclusions of this study must be examined carefully and not taken as absolute.

Ravallion (2006) offers yet another perspective on the debate as to the effect of trade liberalization on the poor in developing countries. Ravallion studies the link between trade liberalization and poverty on both a macro and micro level. On the macro level, he uses cross-country comparisons and aggregate time series data. His cross-country comparison demonstrates a very weak to no relationship between trade liberalization and poverty reduction overall. However, his model is very simplified and many control variables are left out and included in the error term. Therefore it is reasonable, although not necessarily true that a more detailed cross-country study may demonstrate a stronger correlation between the two. This again demonstrates the mixed results that empirical work has demonstrated on whether trade liberalization reduces poverty worldwide. The micro level research looks at a case study of China, and a previous study

of Ravallion and Lushkin (2004) in Morocco, which will be discussed later. These studies reveal diverse impacts of trade reform on poverty at pre-reform income levels.

Ravallion (2006) concludes by arguing that both the presumptions that trade liberalization will always lead to poverty reduction in the short term, and that trade liberalization always leaves the poor worse off, are false. The cross-sectional and time series data leads to the conclusion that trade openness is not a reliable method of reducing poverty. Thus, this study also finds no consensus as to the impact of trade liberalization on poverty, and again reiterates the previously detailed findings that the impacts of trade reform on poverty are country and sector specific, and depend on a wide range of factors, many of which cannot be easily measured.

Another problem that arises in the literature on globalization and poverty is the difficulty associated with measuring poverty. Deaton (2001) discusses a number of problems with \$1 per day poverty lines. Poverty lines are determined by first setting a world poverty line, as in the \$1 per day line, and then deriving comparable country-specific poverty lines. These poverty lines are then used to count the number of poor people in each country, and totals are added up over countries. Purchasing power parity exchange rates are used to turn the \$1 per day line into national currencies. This is problematic because purchasing power parity rates are often revised, which significantly alters poverty estimates in ways that have nothing to do with the actual experience of poor in developing countries. Again, this suggests that all results derived using such absolute poverty rates must not be taken as absolutely correct. Poverty is difficult to measure as it is not finite. Especially in developing countries, which may not have the resources to accurately measure the poverty rate, such measurements must be considered carefully. This is problematic to the study of the impact of globalization on poverty considering much of the world's poor lives in the developing world.

A multitude of studies either look specifically at developing countries, at one individual country, or at specific populations within a country. Goldberg and Pavcnik (2007) are one such example. Differing from those detailed above, Goldberg and Pavcnik (2007) look specifically at developing countries, and survey recent empirical research on how globalization has impacted inequality in such countries. Although studying the impact on inequality is slightly different than studying the impact on poverty, because inequality can increase while the absolute level of poverty still declines, the two are related and thus inequality is worth mentioning in this context. The authors find, once again, that no clear consensus or conclusion can be drawn from the data. Rather, they argue that the impact that globalization has on inequality are country, time, and circumstance specific. They argue that the impact of trade liberalization should be examined in conjunction with other policy reforms, and that the implementation details of trade reform policies can also determine the effect of the policy on inequality (Goldberg & Pavcnik 2007).

Anderson and Valenzuela (2007) also focus specifically on developing countries, and study trade distortions, trade liberalization, and its impact on rural farmers in developing countries. They find that current (as of 2007) trade distortion harms farmers in developing countries. They continue by arguing that the real net incomes of farmers in the developing would rise if countries shifted toward free trade and implemented effected trade liberalization policies. In turn, the authors argue that a shift toward free trade in the developing world, if done in the form of trade liberalization of the food sector, would reduce rural poverty. They argue that this would be the case despite of terms of trade deterioration in some developing countries that act as net food importers.

This result is intriguing because it implies that trade liberalization benefits the rural poor. Typically, studies have found the opposite to be true, where trade liberalization benefits the

urban poor and harms the rural poor. For example, Ravallion and Lokshin (2004) study the impact of trade reforms in the cereal industry in Morocco on poverty. This study uses Morocco's national survey of living standards in order to determine the welfare impacts of price changes resulting from trade liberalization policies implemented on the cereal industry (Ravallion & Lokshin 2004). They specifically study the impact of a hypothetical liberalization of the cereal sector. Because Morocco does not have a comparative advantage in cereal production, due to its arid terrain, cereals have traditionally been highly protected in Morocco. The trade reform measures led to a fall in cereal prices, and imports rose. This study is similar in nature in that it uses the household survey data for Morocco. However, the nature of the analysis differs, which will be detailed in the methodology section.

Here, the authors find that a majority of rural poor produce cereals, and that the loss to poor cereal net-producers in rural areas outweighed the gains to poor cereal net-consumers after the trade reforms. They also find that there is a large horizontal impact on inequality due to the trade reforms. This means that there exists inequality between households at the same pre-reform welfare levels. They find that large rural families tended to benefit more than small rural families, but losses from full de-protection are correlated with rural households (Ravallion & Lokshin 2004). While rural households tend to lose, and urban households tend to gain, overall the authors find a negative impact on consumption and an increase in inequality. It is important to note that Ravellion and Lokshin (2004) looked at consumption as opposed to income in order to measure poverty, as will this paper. However, previous researchers have made the case that the impact of globalization on poverty is case-specific. Therefore, it is likely that these results are more reliable than studies attempting to determine a global effect of trade liberalization on poverty. However, these results cannot necessarily be applied to other cases.

Similarly, Goldberg and Pavcnik (2005) focus solely on Colombia, which experienced a major movement toward trade liberalization in the 1980's and 1990's. Differing from Ravallion and Lokshin (2004), the authors use a partial equilibrium model to study the effect of trade liberalization on poverty in the short and medium run. They focus specifically on urban poverty, and examine how the trade liberalization policies impacted employment conditions and wages (Goldberg & Pavcnik 2005). Using this labor channel, they fail to find a link between the trade reforms and urban poverty. Rather they find that urban poverty is more correlated with factors such as unemployment, and non-compliance with minimum wages by employers, and no indication that trade liberalization impacted any of these variables significantly.

However, here it is important to note their method of measurement. By focusing solely on the labor market, Goldberg and Pavcnik (2005) fail to address the potential impact that trade liberalization may have had on consumption. If the trade reforms led to a decrease in prices, this may be reflected by an increase in consumption. This could have the effect of alleviating poverty, even in the absence of a gross increase in income. This study will address consumption patterns as a result of trade liberalization.

Edmonds and Pavcnik (2005) also study the impact of trade liberalization. However, they differ in that their study focuses specifically on the impact of increased rice prices on child labor in Vietnam. This is relevant because the study dealt with a major export in Vietnam, and its impact on child labor, which logically tends to decrease as poverty decreases. The study found that as the price of rice increased after the trade liberalization, the rate of child labor in Vietnam decreased, specifically in households that are producers of rice. This implies that in Vietnam, trade liberalization helped the rural poor. The major contribution of Edmonds and Pavcnik (2005) in regards to this paper is their use of household survey data to conduct their study. This

study will similarly use household survey data to study the impact of trade liberalization, specifically tariff reductions, on poverty in Panama.

The World Bank (2000), published a comprehensive assessment of poverty in Panama. Although not widely known, I include this publication mainly because it focused on Panama, which is the focus of this paper's analysis. This publication covered a variety of topics, including a simulated impact of free trade reforms in Panama. They used a simulated model because the paper used data from Panama's 1997 Living Standards Measurement Survey (LSMS). At the time of this study, the Living Standards Measurement Survey had only been conducted for 1997, and thus the World Bank only had one set of data to use. The simulation attempted to determine the redistributive effects of the tariff reforms. This simulation includes a hypothetical elimination of all tariffs compared to their 1997 levels, using 1997 prices (The World Bank 2000). They justify this analysis by stating that although this drastic elimination of tariffs is hypothetical in nature, and although Panama did not intend to eliminate all tariffs completely, this type of analysis describes the possible redistributive effects of the 1997 tariff reductions, as well as possible future tariff reductions. This simulation found that there was a significant positive effect of the trade liberalization on a large share of consumers. Furthermore, the simulation found that less than two percent of the population would lose from the simulated tariff reductions to a free trade level. They conclude that the benefits to net gainers outweigh the losses to net losers, and thus the tariff reductions had a positive impact in Panama. The current study is similar to the World Bank's 2000 publication in that I use LSMS data to conduct my analysis, and that I am studying the impact of tariff reductions on poverty in Panama. However, my study differs in that I am able to use LSMS data collected in 2003 and 2008, which did not exist at the

time of the World Bank's publication. I also focus primarily on food consumption, since that is of particular importance in relation to poverty alleviation.

The past research detailed above demonstrates the overarching theme in the literature that there is no consensus as to the relationship between trade liberalization and poverty. Further research is needed to determine whether globalization has definitely improved or harmed the welfare of the world's poor. More likely than not, as demonstrated in the previous research, there is no consensus, and no absolute answer than can be applied to any country. Rather, the impact of trade liberalization is likely case specific, at least in the short/medium run. For this reason, this study will discuss the impact that trade liberalizations had on consumption in Panama, after Panama's accession into the World Trade Organization in 1997.

Chapter 3

Theory

This study attempts to determine the impact of trade liberalization on poverty in Panama since it joined the WTO in 1997. I attempt to study this by determining the relationship between the average tariff rates on major agricultural products produced in Panama and food consumption. I do this because food consumption accounts for a large proportion of the budget for the poor. Thus, an increase in food consumption can be used to signal an increase in the wellbeing of the poor.

As detailed in the introduction, tariffs on imports for a number of different types of goods were reduced immediately prior to and at the time of Panama's entrance into the WTO. Historically, the import tariffs on agricultural products, and in particular basic foodstuffs, were particularly high, and trade was highly distorted in these sectors in Panama. When Panama joined the WTO, it began to reduce the tariffs on agricultural products and basic foodstuffs. Although many of these goods remain protected to some degree, the change in tariff rates on agricultural products in Panama has decreased significantly since the early 1990's. For net consumers of these goods, we would expect a reduction in the import tariff on basic foodstuffs, and in turn an expected reduction in the price of these basic foodstuffs, to result in an increase in food consumption. I make the conjecture that an increase in food consumption is indicative of an increase in wellbeing and a reduction of poverty.

It is important to note that for the purposes of this analysis it is not necessary to choose a measure of poverty. This is because I am not directly measuring poverty but am using household

survey data to measure food consumption. An increase in food consumption would correspond to an increase in a household's wellbeing, especially if that household is poor.

As is demonstrated in Ravallion and Lokshin (2004), winners and losers within a single economy often result from trade liberalization policies. As previously detailed, their study analyzed a possible reduction in the tariff rate of cereals, a basic foodstuff, in Morocco. Their study found that these tariff reductions would impact people in different sectors in different ways. In particular, they found that the losses to the rural poor that acted as net producers of cereals outweighed the gains to rural poor that were net consumers of cereals. Thus, in this case, proposed trade liberalizations in the cereal sector could have a negative impact on the wellbeing of the poor. Contrastingly, the World Bank (2000) study that simulated a free trade scenario in Panama found that the gains to consumers outweighed the losses and that the hypothesized trade liberalizations had an overall positive effect.

In this case, it is important to once again note that poverty in Panama is heavily concentrated in rural and rural indigenous areas, and that agriculture accounts for a significant portion of income in rural areas. Thus, it is likely that households located in rural areas are producers of agricultural goods. This implies that a reduction in the price of agricultural products resulting from reduced tariff rates could negatively impact rural households that are net producers of these goods. However, it is also possible that producers of agricultural goods remain net consumers of agricultural goods. This would occur on small farms that cannot fully rely on subsistence farming. Many cash crops produced in Panama are cultivated on large plantations. In this case, poor rural households may be laborers on these large plantations. If tariff reductions lead to a decrease in the price of the goods produced on these plantations, and thus a decrease in the wage of these laborers, laborers could be negatively impacted by these

trade liberalizations. On the other hand, if these laborers are net consumers of these goods, they could also benefit from a reduction in the price of the foodstuffs they are purchasing, leading to an increase in food consumption.

Thus, it is apparent that the impact of tariff reductions on major agricultural products produced in Panama on food consumption is not easily determined, and is likely very nuanced and varying between urban and rural areas. It is likely that these trade reforms would impact households in different areas and different sectors in a different manner.

I hypothesize that overall, the reduction in the tariff rates on major agricultural goods produced in Panama will correspond to an increase in food consumption. I make this hypothesis for a multitude of reasons. The first of these reasons is that Panama has a substantial services sector. In particular, much of the labor surrounding the Canal Zone does not include agricultural production, and is more focused in the services sector. Therefore, I expect urban households to be net consumers of agricultural goods produced in Panama. Thus, if the reduction in the tariff rate over time of major agricultural goods produced in Panama led to a decrease in the price of these goods, urban households should tend to benefit from these trade liberalization policies and food consumption should increase.

It is important to note that poverty is primarily concentrated in rural and rural indigenous as opposed to urban areas. Therefore, it is imperative to extend my hypothesis to rural and indigenous households. I expect that the reduction in the tariff rate on major agricultural goods to have less of a positive relationship with food consumption. This is because rural and indigenous households are more likely to be farming households that act as producers of agricultural products. Furthermore, it is plausible that rural laborers are employed on the large plantations that produce cash crops. Therefore, if the reduction in the tariff rate on these goods corresponds

to a decrease in the price, these laborers could experience a decrease in their wages. This indicates that a significant portion of the rural population does not make its living solely from agricultural production. If this occurs, it is possible their loss in income could counteract the consumption benefit from a decrease in prices, and rural households could lose overall. However, rural households that engage in subsistence farming may still act as net consumers of agricultural product if they do not rely solely on subsistence farming. If this occurs, it is possible that rural households may benefit from the reduction in the tariff on agricultural goods.

Specific Factors Model as Evidence

A basic analysis of the specific factors model, originally developed by Jacob Viner (1931), can help shed some light into how these trade reforms could impact the poor in rural versus urban areas in different sectors. Here I will assume that there are two specific factors, capital and land, and one mobile factor, labor. For the purposes of this demonstration, I will also assume that there are two types of goods being produced, agricultural goods, which is capital intensive and manufactures, which is land intensive. It is important to note that this is a simplification made within this model and is not necessarily a holistic depiction of the Panamanian economy.

If capital and land are held constant, we can examine how a change in the tariff rate on agricultural goods would impact the real returns to labor. A reduction in the tariff rates on major agricultural goods produced should result in a decrease in the price of those goods. Here we also assume that the price of manufactures did not change over this time. This is a reasonable assumption because the Panamanian Balboa is pegged 1:1 to the US dollar. Furthermore, the

tariff rate on major manufactures, such as apparel, did not change significantly during this time period, according to tariff data from the World Trade Organization. If the price of agricultural goods falls, the marginal value product of labor in agricultural goods would decline, shown in figure 1 as a shift inward. Thus, labor would shift from the agricultural sector toward manufactures. The wage to labor in the agricultural sector would decline because of the inward shift of the marginal value product of labor in food. However, the wage would decline by less than the price of agricultural goods since the quantity of labor in the agricultural sector would also decline. Therefore, the marginal product of labor, which is equal to the wage in the agricultural sector divided by the price of goods in the agricultural sector, increases. In other words, the real return to labor increases.

Figure 1, shown on the following page, helps to demonstrate the movement of labor from the agricultural sector to the manufactures sector. This graph also demonstrates the decline in the wage, in relation to the decrease in the price of agricultural goods. Figure 2, also shown on the following page, demonstrates the shift in production from agricultural goods from manufactures that would take place as a result of this decline in the price of agricultural goods.

Figure 1: Decrease in Price of Agric. Goods

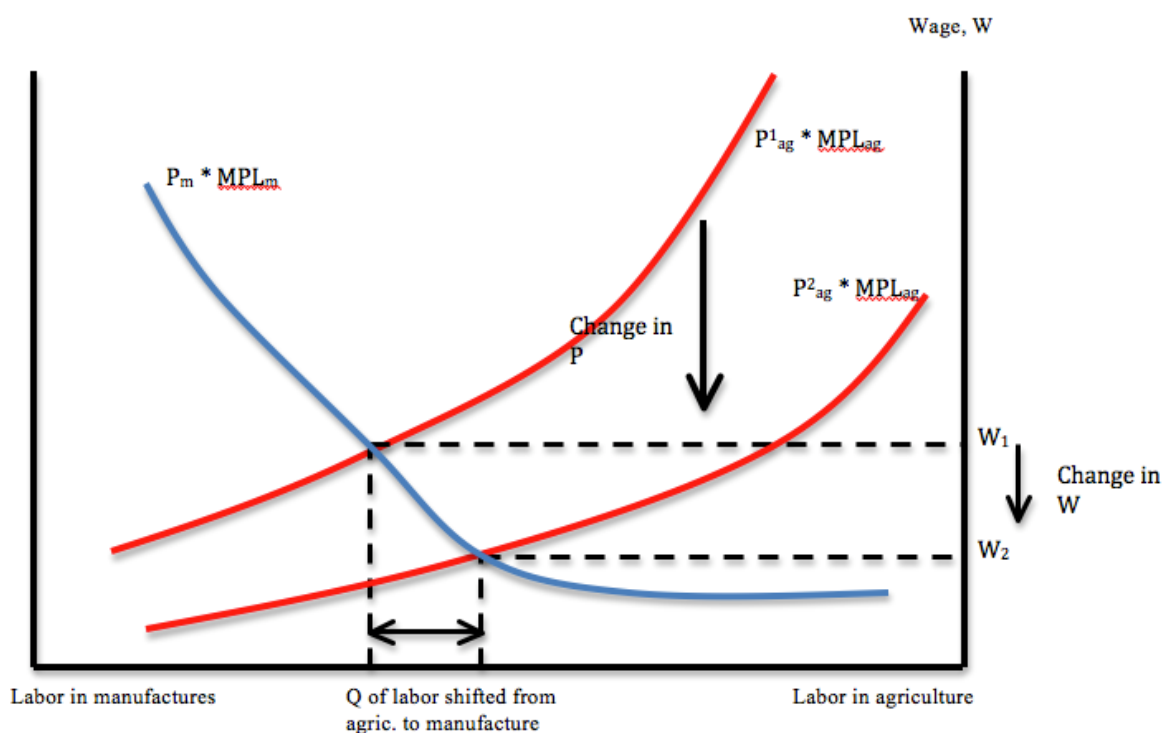
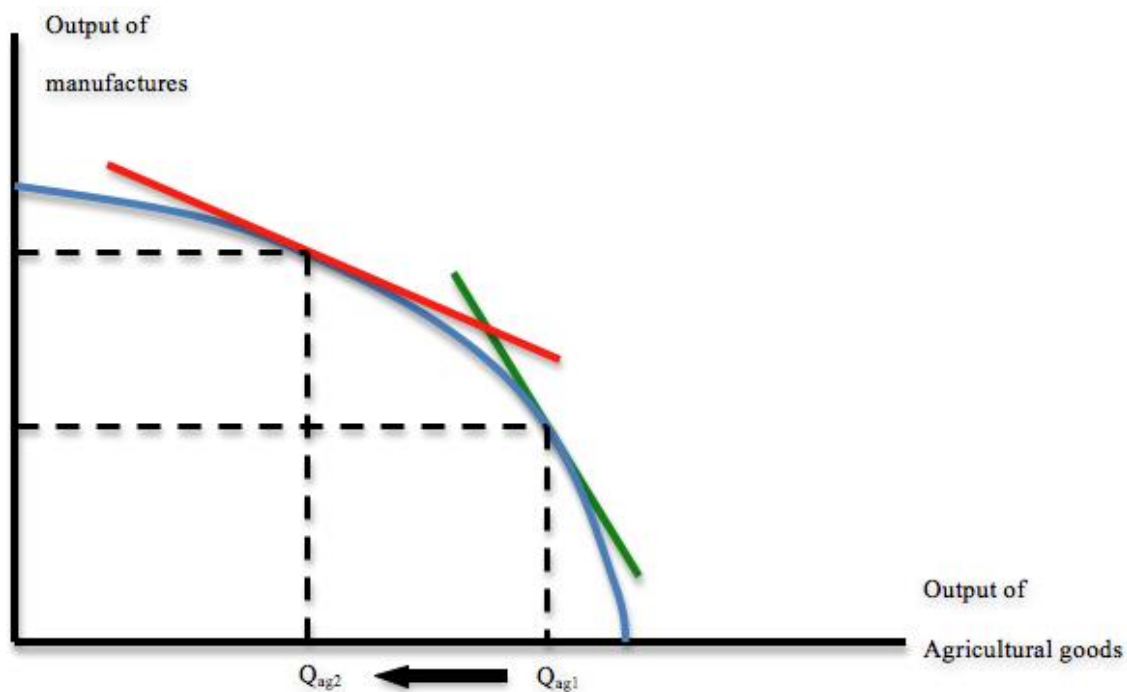


Figure 2: Decrease in Agricultural Production



The impact that this shift has on labor depends on labor's consumption preferences. If labor consumes more agricultural goods than manufactures, labor would benefit from the decrease in the price of agricultural goods that would result from a decrease in the tariff rate on those goods. Conversely, if labor purchased more manufactures, it would lose, as manufactures would become relatively more expensive. According to the World Bank (2000), spending on food accounts for 59 percent of consumption by poor households. Thus, I would expect poor laborers in Panama to purchase more food than manufactures. This would indicate that poor laborers in Panama would have benefited from the decrease in the tariff rate on major agricultural goods that occurred during this time period. In other words, an analysis of the specific factors model in relation to the trade liberalizations in Panama after it joined the WTO indicates that poor labor would have benefitted from the reforms, and that food consumption should appear to increase as a result.

However, it is important to note that this model assumes that labor is perfectly mobile between sectors. In other words, this model assumes that there are no barriers to migration and that rural households previously employed in agricultural production can seamlessly move to urban areas and gain employment in industry. However, this is a major simplification which may not hold true in reality. For example, a farming household located in a rural region experiences barriers to migration in that they may own land in a rural household and would have to sell this land and find housing in an urban area in order to move to the industrial sector. Furthermore, rural households may have skills that are not immediately transferrable to the industrial sector. Therefore, if labor is not perfectly mobile, it may not benefit from the reduction in the tariff rate that occurred over the sample period. If this is the case, and rural households are unable to

migrate from the agricultural sector to industry, their income will be tied to the price of agricultural goods. In turn, they would lose from the decrease in the price of agricultural goods that would result from the reduction in the tariff rate on those goods. For this reason, it is important to distinguish between areas in this analysis of the relationship between the tariff rate on agricultural goods and food consumption. In the analysis to follow, I include one model that does not differentiate between areas and then incorporate models that control for geographic area and interactions between area and the average tariff rate.

Chapter 4

Analysis

This analysis begins by describing the data being analyzed and establishing the research design. The section continues by explaining the operationalization of the dependent variable, independent variables, and control variables. The section ends by displaying and analyzing the results of the statistical analysis.

Research Design

My statistical analysis utilizes household level survey data from the World Bank. I use the Living Standards Measurement Survey for Panama. This survey was conducted in 1997, 2003, and 2008. From here I am able to determine food consumption per household, as well as whether the household was located in a rural, urban, or rural indigenous area in each of these years. I create dummy variables for each location category. I estimate the average tariff rate on major agricultural goods produced in Panama in each of the time points available in the LSMS data. I do this in order to estimate the change in the average tariff rate on major agricultural products produced in Panama during this time. I use data collected from the Statistics Division of the Food and Agriculture Organization of the United Nations Statistics Division to determine the major agricultural products produced in Panama during these three time points. I then use tariff data from the World Trade Organization to aggregate the trade weighted average tariff for these products during each of the three time points. I calculate the tariff rate first excluding, and then including sugar cane. I do this because sugar cane is produced in large quantities and is heavily protected by tariffs, in order to determine if this skews the data.

The analysis first utilizes a linear regression to assess the relationship between my dependent variable, food consumption, and my independent variable, the weighted average tariff rate. I then employ three multivariate regressions to determine any change in the relationship that may occur with the addition of control variables. I first do this using the tariff rate that does not include sugar cane, and then repeat the process with the inclusion of sugar cane. This addition is imperative because I control for difference in the location of the household, and I expect there to be a significant difference between urban, rural, and rural indigenous households. The second control variable is the number of people per household. I logically expect food consumption to increase with the number of people per household, and so this interaction is also important to this analysis. Furthermore, I include an interaction term between the dummy variables for area and the weighted average tariff rate in order to account for an interaction between the two, as I expect the weighted average tariff rate to impact households in different sectors, and thus different areas in a different manner. I also include an interaction term between the weighted average tariff rate and the number of people per household in order to check for any reaction between them as well.

Table 1 included on the following page contains a basic analysis each of my variables and includes the variable name, mean value, standard deviation, minimum, and maximum values.

Table 1: Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
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ln(food consumption per household)	18,191	7.597885	.7018401	1.812984	10.31064
weighted average tariff rate per year observed excluding sugar cane	18,229	.2834206	.0578915	.2126444	.3435539
weighted average tariff rate per year observed including sugar cane	18,229	.9099428	.0305189	.8723792	.9431692
Rural (binary variable)	18,229	.4022162	.4903586	0	1
Indigenous (binary variable)	18,229	.0694498	.2542244	0	1
Number of people per household	18,229	4.082122	2.477395	1	25

Description of Variables

Dependent Variable

My dependent variable is food consumption per household. This variable comes from the Living Standards Measurement Survey, and is calculated per household in each year of the survey. This survey was conducted in 1997, 2003, and 2008. The description of the variables that accompanies this survey does not clearly indicate the unit of measure of food consumption per household. However, because I know that the GNI per capita in 1997 was 3,080 US dollars, I conjecture given the values presented in the survey that food consumption per household was also measured in US dollars (The World Bank 2000). This is likely because the Panamanian Balboa is pegged to the US dollar 1:1 and has been since its introduction in 1904. US dollars are also an official currency in Panama. In order to normalize my analysis, and in turn my results, I took the natural log of food consumption per household, and used this as my dependent variable. I did this because the absolute values for food consumption per household were significantly higher than those of the independent and control variables. I chose food consumption per household as my proxy for household wellbeing. I did this because for the poor, food consumption accounts for over half of income expenditures (The World Bank 2000). Therefore, I would expect expenditures on food consumption to change in response in to a change in the price of agricultural goods.

Independent Variable

My independent variable is the weighted average tariff rate on major agricultural goods produced in Panama at each of these three time points. In order to calculate this rate, I first

determined what I will classify as major agricultural goods. I used agricultural production data from the Food and Agriculture Organization of the United Nations. I chose to quantify the data by production quantity for the years 1997, 2003, and 2008, since these were the time points that I had the ability to study based on the availability of LSMS data. I established my minimum quantity at 15,000 units of production for at least one of the three time points. I did this so as to include all major agricultural goods produced in Panama during this time. The major agricultural goods included were paddy rice, maize, sorghum, cassava, potatoes, yams, coconuts, palm oil, tomatoes, onions, bananas, plantains, oranges, watermelons, melons, pineapples, and sugar cane. I next calculated the share of production of these major agricultural products that each good accounted for. Then I used tariff data from the World Bank to calculate the weighted average tariff rate over these goods. This data contained the average ad valorem tariff on each of the major agricultural goods during each of the three time points.

I chose to examine the weighted average tariff on major agricultural goods as opposed to over all agricultural goods produced. I made this determination because most of the other goods produced in Panama at this time accounted for a very small proportion of overall production and did not include basic agricultural foodstuffs. Furthermore, many of these goods had almost negligible or no tariffs throughout each of the time points that this study includes. Therefore, there would be no or almost no change in the weighted average tariff rate because of these goods. I determined that accounting for total agricultural production would not enhance this study.

It is also important to note that I run one set of analyses excluding sugar cane from the weighted average tariff rate on major agricultural goods produced, despite the fact that it is a major agricultural good produced in Panama. I then run a second set of analyses in which I include sugar cane in the weighted average tariff rate. I make this determination because sugar

cane is mainly a cash crop cultivated for export. Therefore, the ad valorem tariff rate on sugar cane remained extremely high, at 144 percent throughout each of the time points examined in this analysis. Due to the large quantities of sugar cane produced, and the extremely high tariff rate associated with it despite it not necessarily being a basic foodstuff, I determined that the inclusion of sugar cane could skew my results. Conversely, since sugar cane is one of Panama's major cash crops, it is probable that many laborers work on plantations that cultivate sugar cane. Therefore, sugar cane could be an important determinant of income in some rural households. In turn, I felt that the inclusion of sugar cane was important. However, I run an analysis without it as well to examine whether its inclusion skews my results.

Tables 2 and 3, shown below, list the weighted average tariff rates on the major agricultural goods produced during each of the three time points examined in this study. Table 2 excludes sugar cane from this calculation, while table 3 includes it.

Table 2: Weighted average tariff rates excluding sugar

Year	Weighted average tariff rate on agricultural goods produced excluding sugar
1997	0.307479896
2003	0.34355392
2008	0.21264436

Table 3: Weighted average tariff rates including sugar cane

Year	Weighted average tariff rate on agricultural goods produced including sugar
1997	0.943169151
2003	0.926358174
2008	0.872379192

It is interesting to note that in Table 2, that the weighted average tariff rate appears to increase before it decreases, while this does not occur when sugar cane is included in the calculation. A closer examination of the tariff and production data reveal that this is due to a change in the share of agricultural production attributed to paddy rice. From 1997 to 2003, the share of paddy rice increased by approximately 0.1. However, the tariff rate remained constant at a relatively high 52.5 percent. From 2003 to 2008, the share of agricultural production made up of paddy rice remained relatively stable, while the tariff rate decreased to 45 percent. I conjecture that this result is masked when the weighted average tariff rate includes sugar cane production due to the fact that quantity of production and high tariff rate may skew the calculation.

Control Variables

My first control variable is area. Data on area comes from the LSMS data and is quantified by household. Area is defined as urban, rural, indigenous, or remote. These classifications are coded in the survey data as ranging from 1-4, where 1 refers to urban, 2 refers to rural, 3 refers to indigenous, and 4 refers to remote. From this, I create binary variables for rural and indigenous areas. Since poverty is concentrated in rural and indigenous areas, I expect the coefficient on each of these control variables to be negative and significant. Since poverty is even more widespread in indigenous areas (The World Bank 2000), I expect this negative coefficient to be greater for the binary variable that refers to indigenous areas. Remote is only used as a classification in the 1997 LSMS survey, and accounts for an extremely small proportion of observations. Therefore, I drop observations in which area is coded as remote in order to avoid issues of collinearity that would arise when attempting to create an interaction variable between the weighted average tariff rate per year and the binary variable for remote. I do not create a binary variable for urban households in order to avoid issues of collinearity. I

choose to exclude this category since urban is the baseline against which the other two areas are compared. Because it is already coded as 1 in the LSMS data, it will be described in the intercept term of the regression. I expect there to be a positive effect of being located in an urban area on food consumption, since poverty is less widespread in Panama's urban areas.

I include these control variables because poverty is concentrated in rural areas, and is particularly severe in indigenous areas, according to the World Bank (2000). Thus, I expect the area in which the household is located to have a significant effect on food consumption. I also include an interaction term between the weighted average tariff rate on agricultural production and each of the binary variables representing rural and indigenous areas. I include this term because I expect that the change in the weighted average tariff rate to impact food consumption more in poor households, and in turn more in rural and indigenous households. This is because a decline in the price of food will allow poor households to purchase more food, all else held constant. Food consumption accounts for a greater proportion of budgets in poor households. In non-poor households, food consumption may not increase as much with a decrease in the tariff rate on agricultural goods since these households are more likely to already afford adequate food consumption. Since poor households are concentrated more heavily in rural and indigenous areas, I expect there to be a significant interaction between the area that the household is located in and the effect of the weighted average tariff rate.

My second control variable is the number of people per household. I include this control variable because I expect food consumption per household to naturally increase with the number of individuals per household. Thus, the number of people per household may account for variation in food consumption between households in the same geographical location and the same income level, although income level is not a part of this study.

Results and Analysis

Table 4, listed below, details the results of the initial statistical analysis. Model 1 consists of a linear regression of food consumption on the weighted average tariff rate of major agricultural goods produced excluding sugar cane, and does not differentiate between areas. Model 2 consists of a multivariable regression of food consumption on the weighted average tariff rate excluding sugar cane, and includes all of the control variables. Model 3 builds off of Model 2 by including an interaction terms between the binary variables for rural and indigenous, and the weighted average tariff rate.

Table 4: Effects of the weighted average tariff rate of major agricultural goods produced on food consumption excluding sugar cane

	Model 1	Model 2	Model 3
Variable	<i>ln(Food consumption per household)</i>	<i>ln(Food consumption per household)</i>	<i>ln(food consumption per household)</i>
<i>Weighted avg. tariff rate on major agricultural goods produced excluding sugar</i>	-.3408574*** (.0898843)	-.5955077*** (.0779526)	-.9966242*** (.1063967)
<i>Rural</i>		-.3853815 *** (.0094296)	-.581812*** (.0469792)
<i>Indigenous</i>		-1.117102*** (.0191218)	-1.654262*** (.0934895)
<i>Number of people per household</i>		.111009*** (.0019113)	.1111379*** (.0019185)
<i>Rural * weighted avg. tariff rate (interaction term)</i>			.6935079*** (.6935079)
<i>Indigenous * weighted avg. tariff rate (interaction term)</i>			1.887781*** (.3219313)
<i>Intercept term</i>	7.691118*** (.0260029)	7.545332*** (.0235909)	7.658382*** (.0312603)
<i>R-squared</i>	0.0008	0.2429	0.2526
	* <i>p</i> <0.05	** <i>p</i> <.01	*** <i>p</i> <.0001

First consider Model 1, which does not differentiate between areas that households are located in, and presumes that all households react to tariff reductions in the same way. Such would be the case if labor is perfectly mobile, as explained in the analysis of the specific factors model. From this analysis, one can see that the weighted average tariff rate on major agricultural goods produced has a negative effect on the value of food consumption that is statistically significant at the .001 level. This must be interpreted to mean that an increase in the weighted average tariff rate corresponds to a decrease in the value of food consumption. Conversely, this would indicate that as the weighted average tariff rate decreased, as it did in Panama during this time period, the value of food consumption per household would appear to increase.

I would expect the price of major agricultural goods to decline as the tariff on these goods declines. Therefore, I expect that the price of major agricultural goods declined over the sample period examined in this paper. In turn, the value of food consumption would appear to increase as the price of major agricultural goods decreased. Since the price of major agricultural goods declined as the expenditures on food increased, the quantity of food consumed must have also increased. However, because the dependent variable here is the value of food consumption, an analysis of price elasticity of demand is necessary in order to make inferences about how and why the quantity of food consumption appears to increase as the weighted average tariff on major agricultural goods declined. The equation for price elasticity of demand is shown in Figure 3 below.

Figure 3: Elasticity of Demand

$$\epsilon_D = \Delta Q/Q \div \Delta P/P$$

Price elasticity of demand is equal to the percent change in quantity divided by the percent change in price, as shown above. Because the major agricultural goods included in this analysis constitute basic foodstuffs and major cash crops, I propose that the price elasticity of demand for these goods is less than one. In other words, I propose that the demand for major agricultural goods is relatively inelastic. This proposition is intuitive for a number of reasons. First, if the demand for agricultural goods was relatively elastic, this would indicate that a 1 percent increase in the price of a good would result in greater than a one percent decrease in the demand for that good. This seems counterintuitive since agricultural goods represent basic food items. Many major agricultural goods, such as rice, could be considered necessities, and households must still eat even if the price increases.

Therefore, I expect the price elasticity of demand for major agricultural goods to be less than one. However, if demand is inelastic and the price of agricultural goods falls, expenditures on food consumption should appear to decline as well. The percentage increase in the quantity of food consumption would have to be less than the percentage decrease in the price of agricultural goods, and thus expenditures would fall. However, the analysis in Model 1 demonstrates that the value of food consumption increases while the average tariff rate on major agricultural goods decreases. In other words, this analysis indicates that a decrease in the price of agricultural goods is associated with an increase in expenditures. This would indicate that the price elasticity of demand is relatively elastic. However, this remains counterintuitive for the reasons explained above. Rather, I propose that an exogenous factor caused income to rise over the sample period to the point where it dominated the price effect on food consumption. In other words, expenditures rose while prices decreased because income increased, and thus households could afford to increase expenditures and consume a greater quantity of food.

In general I expect that an increase in income contributed to the rise in food expenditures that occurred as the price of agricultural goods fell, as shown in Model 1. This indicates that the quantity of food consumed increased over the sample period, as the average tariff rate declined. This suggests that my original hypothesis is correct. I originally hypothesized that the decrease in the weighted average tariff rate on major agricultural goods produced in Panama between 1997 and 2008 would contribute to an increase in the amount of food consumption per household within this time. The results of my analysis suggest that this is true.

It is logical that incomes would have increased in Panama over the sample period due to the increase in Panama's openness to trade after joining the WTO in 1997. However, it is also plausible that this increase in income affected different sectors differently, as explained in the theory section. Therefore, an analysis which accounts for differences between areas is also valuable to this discussion. Especially in urban areas where the service sector is developed, and near the Canal Zone where trade takes place, an increase in openness to trade would likely lead to an increase in income. In order to examine how food consumption differed between households located in different regions, and in turn different sectors, I will next consider Model 2. In Model 2, we can see that the coefficients on the weighted average tariff rate, rural, and indigenous, are all negative and highly significant. This result is consistent with that of Model 1, indicating that a decrease in the average tariff rate on major agricultural goods would correspond to an increase in the value of food consumption. Keeping in mind that urban households are included in the intercept term, this model is interpreted to mean that the value of food consumption decreases when a household is located in a rural or indigenous area. This is logical and expected considering that poverty in Panama is concentrated in rural and indigenous areas. The negative coefficient on indigenous is even larger, which is logical since poverty is even

more severe and common in indigenous areas (The World Bank 2000). This also implies that the value of food consumption increases when a household is located in an urban area. This is logical because urban areas in Panama tend to be more prosperous. The coefficient on the number of people per household is also positive and significant. This is interpreted to mean that as the number of people per household increases, so does food consumption per household. This is naturally expected since on average, a greater number of people would have to spend more on food consumption.

Next I will consider Model 3 in order to examine how households in different areas were affected by the decrease in the weighted average tariff rate on agricultural goods that took place over the sample period. Model 3 includes interaction terms between rural households and the average tariff rate, and between indigenous households and average tariff rate. This allows for the effect of the average tariff rate of major agricultural goods to depend on region. This may occur if household income was directly affected by the tariff rate, as would be the case in households engaged in agricultural production or that acted as laborers on large plantations. We can see from the interaction terms between rural and indigenous households and the average tariff rate that the decrease in price that corresponds to the decrease in the average tariff rate during this time period did depend on region, since these interaction terms are positive and significant.

The positive coefficient on the interaction term between rural and the average tariff rate is less than the negative coefficient on the average tariff rate. This means that overall, rural non-indigenous households still experienced an increase in the value of food consumption as the average tariff rate on agricultural goods declined. However, this demonstrates that the value of food consumption in rural households increased by less than in urban households. This suggests

that incomes to rural households likely increased by less than urban incomes, as the tariff on major agricultural goods declined. This is logical since rural households are more likely to be employed in the agricultural sector or to work as laborers on large plantations. Thus, the corresponding increase in the quantity of food consumed by rural households would be less than that of urban households.

Conversely, the positive coefficient on interaction term between indigenous and the average tariff rate is larger than the negative coefficient on the average tariff rate. This means that overall, indigenous households experienced a decrease in the value of food consumption as the average tariff rate on agricultural goods declined. The decrease in the average tariff rate that occurred over the sample period should correspond to a decrease in the price of agricultural goods. However, the overall value of food consumption decreased as the average tariff rate decreased in indigenous households. This suggests that incomes to indigenous households likely decreased. This is logical since indigenous areas are likely to be heavily reliant on agricultural production, and since poverty is highly concentrated in indigenous areas. However, it is interesting to note the difference between rural non-indigenous households and indigenous households. Although both areas are more likely to be employed in the agricultural sector, only indigenous areas lost overall. I expected that rural and indigenous households would benefit less than urban households, but did not expect to see the overall difference between rural and indigenous households. This indicates that there is some exogenous factor that accounts for the difference between these two areas. The control variable for the number of people per household remains positive and significant in model, as is expected since the value of food consumption should appear to increase with the number of people per household.

Though the results of my analysis indicate that my overall hypothesis was correct, it is important to note that this effect is not as drastic as I had expected. The coefficient on the weighted average tariff rate on major agricultural production is relatively small throughout all three models, although it is significant and in the direction that I predicted. This indicates that its effect may not be particularly strong. It is also important to note that the tariff rate effected households in urban, rural, and indigenous areas differently. This suggests that the specific factors model described in the theory section does not adequately describe the effect of the decrease in the tariff rate on major agricultural goods in Panama over the sample period. This further suggests that labor is not perfectly mobile in Panama. The R-squared values for the three models that include the controls and interaction terms are between .2429 and .2556, indicating that these models do help to explain the relationship between the weighted average tariff on major agricultural goods on the value of food consumption, but that there are likely other variables not being taken into account.

Table 5, shown below, repeats the analysis displayed in table 4, but includes sugar cane production in the calculations of the weighted average tariff rate of major agricultural goods produced. As explained in my theory, I initially leave out sugar cane because of its high rates of protection, large quantities of production, despite the fact that it is a cash crop and not necessarily a basic foodstuff. Thus I suspect that sugar cane could skew my results. However, it is also plausible that sugar cane production impacts the market in significant ways, and so I rerun the analysis, accounting for sugar cane production.

Table 5: Effects of the weighted average tariff on major agricultural goods produced on food consumption per household, including sugar cane

	Model 1	Model 2	Model 3
Variable	<i>ln(food consumption per household)</i>	<i>ln(food consumption per household)</i>	<i>ln(food consumption per household)</i>
<i>Weighted avg. tariff rate on major agricultural goods produced including sugar</i>	-.2071484 (.1704288)	-.6923974*** (.1481447)	-.9473943*** (.20382)
<i>Rural</i>		-.3851464*** (.0094426)	-.6632722* (.2814148)
<i>Indigenous</i>		-1.115968*** (.0191539)	-2.823788*** (.5409955)
<i>Number of people per household</i>		.1109304*** (.1109304)	.110954*** (.0019232)
<i>Rural * weighted avg. tariff rate (interaction term)</i>			.3057748 (.3091329)
<i>Indigenous*weighted avg. tariff rate (interaction term)</i>			1.873003** (.592922)
<i>Intercept term</i>	7.786369*** (.1551602)	8.006773*** (.1345216)	8.238593*** (.1851748)
<i>R-squared</i>	0.0001	0.2493	0.2497
	* <i>p</i> <0.05	** <i>p</i> <0.001	*** <i>p</i> <0.001

In the analysis displayed in Table 5, the coefficient on the weighted average tariff on major agricultural goods produced remains negative in Model 1, but only becomes significant at the .001 level once the control variables are introduced in Model 2. This implies that even when sugar cane is included in the analysis, it still appears that a decrease in the weighted average tariff rate on major agriculture goods corresponds to an increase in the value of food consumption. This also indicates that the quantity of food consumption increased as the average tariff rate fell, as described in the analysis of price elasticity of demand for agricultural goods included above. The coefficients on rural and indigenous households remain negative and significant, although the coefficient on rural households is less significant. Furthermore, the interaction terms between indigenous households and the weighted average tariff rates become remain significant, although the interaction between rural households and the tariff rate does not. This indicates that the weighted average tariff rate likely affects indigenous rural households differently when sugar cane production is included in the analysis. It is plausible that many rural households are employed on large sugar plantation, while indigenous households are not. This would account for this difference, since rural households engaged in the production of sugar cane would benefit from high rates of protection on sugar cane. The coefficient on the number of people per household remains positive and significant at the .001 level. This is logical because an increase in the number of people per household should correlate to an increase in food expenditures per household. The R-squared values do not change significantly when sugar cane is introduced. This indicates that the analysis ignoring sugar cane production is approximately as good at explaining the relationship between the weighted average tariff rate on major agricultural goods and the value of food consumption, as is the analysis that includes sugar cane production.

Chapter 5

Conclusions

This analysis indicates that the reduction in tariff rates on basic foodstuffs and major agricultural goods that occurred in Panama during this time period led to an increase in the value of food consumption, when one does not account for differences between the area in which the household is located. Furthermore, since overall expenditures on food increased while the price of agricultural goods seems to decline, this indicates that the overall quantity of food consumption likely increased over the sample period. This is likely due to an overall increase in income that resulted from Panama's increased openness to trade. This indicates that the reduction in tariffs on major agricultural goods likely contributed to an increase in wellbeing, and plausibly a reduction of poverty in Panama, given that food consumption accounts for over half of expenditures by poor households, according to the World Bank. However, it is important to note that the decline in tariff rates on major agricultural goods had less of a positive impact in rural households, and a negative impact on indigenous households. This is likely due to the fact that rural and indigenous households are more likely to be engaged in agricultural production in some form. Thus, their income would increase less, or as is likely the case in indigenous households, decrease as the price of agricultural goods declined. This indicates that there are both winners and losers that resulted from the trade liberalizations that took place in Panama during the sample period. This is interesting because it implies that trade liberalization does not benefit everyone, even when it appears to improve the economic situation overall.

One major limitation of this study is that the impact of the trade liberalizations that took place prior to 1997 cannot be determined. This is because data on food consumption from LSMS data was not collected prior to 1997. Furthermore, Panama did not conduct its own national household surveys during this time period, and thus data on food consumption prior to Panama's entrance into the WTO does not exist. Although it would be interesting to examine the impact of tariff reductions on food consumption in the earlier 90's, since tariff rates were already significantly reduced by the time that Panama entered the WTO, it is beyond the capabilities of this study. Furthermore, this study focuses solely on food consumption. Although the reasons for this are justified, it limits my study in that I do not examine the impact of tariff reductions on goods such as final manufactured goods. However, it is plausible that such changes impacted nonfood consumption.

Furthermore, the R-squared values suggest that there are likely variables missing from the analysis that would help to explain some of the change in food consumption between rural, indigenous, and urban areas over the three time periods included. Further research could focus on the change in income during this time, or on consumption as a whole. Such an analysis may provide a more holistic picture of the impact that trade liberalizations had on the Panamanian economy. A study of this sort would not have to calculate the weighted average tariff rate in the same manner that I did, and could instead focus on the areas where the tariff changed the most, as opposed to how the tariff changed on basic food items important to the lives of the poor, as this study did. A study of this sort would provide a different perspective of the impact of trade liberalizations on the Panamanian economy, but would also be valuable to examining the relationship between trade liberalization and consumption.

A further limitation of this study is the LSMS data itself. This data was not organized into one dataset. Rather, each year was contained in multiple smaller datasets. Furthermore, the dictionary of the variables was not organized into one concise document. This made the data more difficult to accurately interpret and limited what this study was capable of analyzing. Household survey data from the Panama government only dates back to 2006, and so further research could consider using this survey data and limiting the study to a start date of 2006.

BIBLIOGRAPHY

- Anderson, K., & Valenzuela, E.. (2007). Do global trade distortions still harm developing country farmers? *Review of World Economics*, 143(1), 108-139.
doi:<http://dx.doi.org.ezaccess.libraries.psu.edu/10.1007/s10290-007-0100-5>
- Deaton, A.. (2001). Counting the world's poor: problems and possible solutions. *The World Bank Research Observer*, 16(2), 125-147. Doi:10.1093/wbro/16.2.149
- Food and Agriculture Organization of the United Nations. Panama Production Quantity (1997, 2003, 2008). Available from: <http://faostat3.fao.org/download/Q/QC/E>
- Goldberg, P.K., Pavcnik, N.. (2005). The effects of the Colombian trade liberalization on urban poverty. *National Bureau of Economic Research, Working Paper 11081*. doi: 10.3386/w11081
- Goldberg, P.K., Pavcnik, N.. (2007). Distributnal effects of globalization in developing countries. *Journal of Economic Literature*, 45(1), 39-82. doi: 10.3386/w12885
- Harrison, A., McMillan, M.. (2007). On the links between globalization and poverty. *The Journal of Economic Inequality*, 5(1), 123-134. doi:10.1007/s10888-006-9041-9
- Hertel, T. W., Reimer, J. J.. (2005). Predicting the Poverty Impacts of Trade Reform. *Journal Of International Trade & Economic Development*, 14(4), 377-405.
doi:10.1080/09638190500372404
- Ravallion, M.. (2006). Looking beyond averages in the trade and poverty debate. *World Development*, 34(8), 1374-1392. doi:10.1016/j.worlddev.2005.10.015

Ravallion, M., Lokshin, M.. (2004). Gainers and losers from trade reform in Morocco.

Development Research Group, World Bank, Poverty Team, 3368. Retrieved from

<http://elibrary.worldbank.org.ezaccess.libraries.psu.edu/doi/abs/10.1596/1813-9450-3368>

Viner, J. (1931). Cost curves and supply curves. *mit 7 abbildungen. Zeitschrift Für*

Nationalökonomie, 3(1), 23. Retrieved from

<http://ezaccess.libraries.psu.edu/login?url=http://search.proquest.com.ezaccess.libraries.psu.edu/docview/1299501067?accountid=13158>

Winters, L. A., McCulloch, N., & McKay, A.. (2004). Trade Liberalization and Poverty: The

Evidence so Far. *Journal of Economic Literature*, 42(1), 72–115. Retrieved from

<http://www.jstor.org.ezaccess.libraries.psu.edu/stable/3217037>

World Bank. (2000). Panama poverty assessment: priorities and strategies for poverty reduction. Washington, D.C.: World Bank.

World Bank. (1998). Panama 1997 Encuesta de Niveles de Vida Data Files. (part D). Living Standards Measurement Survey. Available from the World Bank web site:

<http://go.worldbank.org/BAKQAWSKG0>

World Bank. (2004). Panama 2003 Encuesta de Niveles de Vida Data Files. (consumption and income aggregates). Living Standards Measurement Survey. Available from the World Bank web site:

<http://go.worldbank.org/VKXPIUSKT0>

World Bank. (2009). Panama 2008 Encuesta de Niveles de Vida Data Files. (part 9). Living Standards Measurement Survey. Available from the World Bank web site:

<http://go.worldbank.org/T8KO7J1PG0>

World Trade Organization. Tariff Download Facility. (Panama 1997, Panama 2003, Panama 2008). Available from: <http://tariffdata.wto.org/default.aspx>

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