


Hunger, Agricultural Production, and Government Policies

Edited by

Dr. Alok Kumar and Abdullah Al Mahmood Mosfeq

Department of Economics,

University of Victoria

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List of Contributors

Andrews, Bryan: Undeclared

Blais, Mitchel: Geography: GEAM

Caldwell, Michael: Pre-Business

Currie, Phil: Pre-Business

Giesbrecht, Jennifer: Geography: GEAM

Ilnicki, Jake: Undeclared

Knox, Brianne: Geography

Leigh, Jerid: Economics

Moorman, Peter: Pre-Business

Murphy, Conor: Economics

Pinches, Carys: Anthropology

Purcell, Genna: Business

Sparrow, Jason: Undeclared

Stewart, Nathan: Pre-Physical Education

Tomalty, Michael: Undeclared

Underhill, Emma: Economics

Valente, Justin: Economics: ECAM

Preface

In the past few years, food price have increased rapidly, greatly undermining progress made in the food security situation all over the world. The FAO (2006) defines food security as a state when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". Food security depends on many things such as availability and affordability of food items, distributional network, and food habits. Food prices play an extremely important role in determining the affordability of food items.

There are many reasons for price increases including drought, an inefficient food distribution system, civil wars, and a rapidly increasing population, but two important factors with long-run implications are the changing consumption pattern due to rising per-capita income and the diversion of food-grains and agricultural land to produce bio-fuels. In recent years, many developing countries such as China and India have witnessed a rapid increase in the demand for meat, poultry and dairy products, with demand for these products forecast to increase more rapidly in the future. Increasing production of meat, poultry and dairy products has resulted in large-scale diversion of food crops to feed. Similarly, there is increasing trend to divert agricultural land away from food-grains to produce bio-fuels and other commercial crops.

The increasing food prices have adversely affected poor in general, particularly poor and marginalized people in African countries. This book is an attempt to analyze the main causes of increasing food-prices, its consequences, how different countries are coping with this phenomenon, and draws policy implications. It examines the experiences of many countries and clearly distinguishes between the global factors and the local factors. Various studies point out that the effects of increasing food prices on poverty, malnutrition, and human capital investment depend on the interaction of these two sets of factors. Policy makers and development agencies need to take into account both set of factors in designing policies.

This book is based on group projects undertaken by students of Development and Economics as a part of their course-work at the University of Victoria, Canada. Broadly, these studies can be divided into sets. The first set of studies analyzes the effects of increasing food prices on poverty, malnutrition, and human capital investment in different countries. The second set of studies

analyzes the development experience of BRICS countries. The rapid growth of these countries has greatly benefited the world and the inhabitants of these countries in particular. However, one adverse consequence of this phenomenon is the rising food prices.

The first chapter examines the effect of increasing food prices in both developing and developed countries. It correctly points out that this phenomenon affects families in both developing and developed countries. Even in the developed countries, a significant proportion of families spend more than half of their income on food. Increasing food prices coupled with stagnant or even declining income due to recent financial crisis, have adversely affected the poor households. These households have been forced to reduce their expenditure on other essential items and increasingly buy cheap but nutritionally poor food items. The reduction in the government support and social programs due to declining tax revenue has aggravated the problem.

The second chapter studies the issue of food security in four regions of the world: Sub-Saharan Africa, Southeast Asia, and Latin America & the Caribbean. While all countries in these regions are categorized as developing countries, there are big differences across these regions in terms of food security and their capacity to cope with rising food prices. Sub-Saharan Africa in particular is especially vulnerable to increasing food prices. Poor access to food results in malnutrition and a subsequent reduction in human capital, one of the barriers to structural change. The nature of food security in a given region, therefore, is indicative of its overall health, social and economic development.

The third chapter examines the performance of the Ugandan economy, which is one of the poorest countries in the world. The persistent poverty in Uganda has induced a number of international organizations such as the IMF and the World Bank to introduce and implement a number of important poverty reduction strategies (PRSPs) in cooperation with the Ugandan government. These organizations have identified underinvestment in agricultural sector, poor infrastructure, inefficient financial services, and poor public sector management as some of the major factors constraining economic development in Uganda. The main focus of this chapter is to examine the effects of PRSPs. It finds that these strategies have helped jump-start the development in the economy, but it has a long way to go.

Chapter four studies the effects of civil war which ravaged Sierra Leone from 1991 to 2002 and left the country's infrastructure and economy decimated. It finds that while some post war redevelopment efforts have been successful, there is still a great deal of work to be done. It argues that it is important to consider the development process in the historical context while taking into account the demographic composition of the nation. Sierra Leone's internal economy relies upon informal business practices while its position in the global economy is reliant on natural resources, most famously, diamond deposits but also titanium ore, bauxite, iron ore and chromites. The situation is beginning to improve as demonstrated by social programs administered by both Sierra Leone's government and foreign NGOs and charitable organizations.

Chapter five examines the trend and consequences of the rapid development witnessed in five countries: Brazil, Russia, India, China, and South Africa together known as the BRICS countries. This paper studies how individual characteristics of these countries have led them to become a significant economic force in the world economy. It finds that each country is unique with its own development trajectories, opportunities, and challenges. For example, Brazil, Russia and South Africa are abundant in natural resources and their development is largely based on exploiting these natural resources. On the other hand, India and China are endowed with a large labor force. Their development is largely based on using their abundant labor force. These countries differ greatly in terms of the role of the government in the development process. In China and Russia the government plays leading role, while in other countries the private sector is much more salient.

Chapter six examines the effect of child labor on human capital investment. Child labor is a manifestation of poverty and poor families use it to augment their income and cope with adverse circumstances such as rising food prices. It links the two strands of theoretical literature, namely, the models of child labour and the models of gender bias. In particular, it analyses the implications for the relative work loads of children of different gender in the presence of parental gender bias. There is an extensive empirical literature which suggests that parental gender bias, particularly in favour of male children, is wide-spread in many regions of the world. This chapter analyzes the effects of parental gender bias on savings, bequests, and child labor. In addition, it examines the implications for child labor due to other forms of gender bias, such as differential quality of schools and labor market discrimination.

The Editors

1 Food Crisis: How High Food Prices Continue to Impact the Poorest

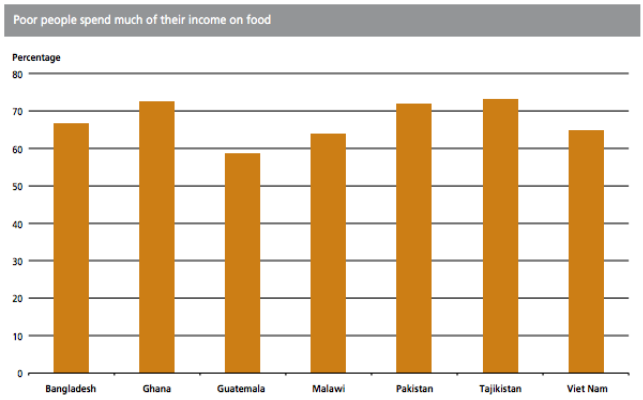
Justin Valente, Bryan Andrews, Jerid Leigh, and Phil Currie

Introduction

The food price crisis is having an increasingly adverse effect on nations around the world, especially to those in a developing state. The UN Food and Agriculture Organization (FAO) have released many publications to raise awareness and to help discover the roots of the causation of the global hunger and malnutrition issues, especially for the many starving children. According to the *State of Food Insecurity in the World* (2011) report released by FAO, high and volatile food prices are predicted to continue. The report claims that because the world's population is grwoing, there are increases in demand from consumers in rapidly growing economies and natural resources are becoming increasingly scarce in regions where supply is needed. The volatility of food prices is predicted to increase due to the greater rate of natural disasters and weather shocks, so the impact on crop production will only worsen. Between 2006 and 2008 the average world price for rice rose by 217%, wheat by 136%, corn by 125% and soybeans by 107% (Haugh, G., Hammond, K., Vakenier, K., & Hong, R, N.D). The UN Food and Agriculture Organization have also stated the rise in production of biofuels to be a contributing factor to the volatility of food prices. The most troubling truth of the food price crisis is that it affects the poorest nations the most. High food prices are a problem for developing nations because many have to import a lot of the food that feeds their population.

As food prices increase and incomes are stagnant, families have to adjust accordingly to be able to afford to feed their households. The World Food Programme (2012) has stated that in countries where they provide support some households have to spend up to sixty to eighty percent of their total income on only food. Figure 1 shows how many different developing nations, no matter which continent they are located on, spend a large portion of their income on food. When food prices rise, there is not much room for these families to adapt. These households, especially in developing nations where government support and social programs are at a bare minimum to non-existent, have to now buy alternative cheaper foods that are often much less nutritious.

Figure 1

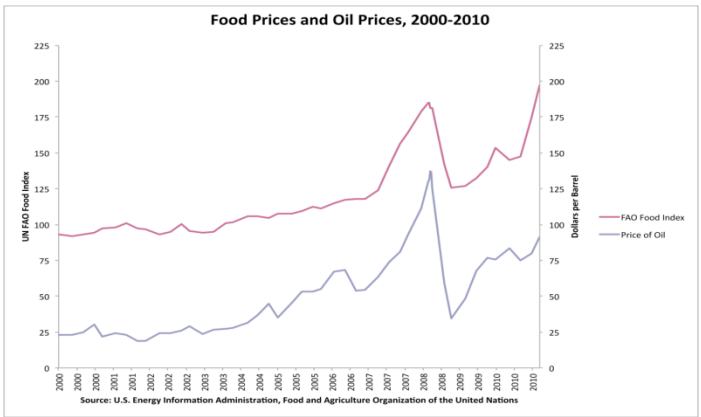


Source: Recent Trends in world food commodity prices: costs and benefits. http://www.fao.org/docrep/014/i2330e/i2330e03.pdf

Along with cutting back on healthier foods, poor families are forced to spend less on public services like schooling and medical services. Not only do these high and volatile food prices have short-term effects on these families' lives but, now a child's development is put in jeopardy as a derivative of this issue. Consequences can affect everyone, but possibly the most hurt by rising food prices are families in developing nations, in particular their children.

The rise in food prices can be linked to several different sources, including droughts in food producing nations and the ever-rising price of oil. The connection between food and oil go hand in hand, as modern agriculture relies on oil products to fuel its farming machinery, as well as transport its imports and exports (Figure 2). The rise in

Figure 2



Source: U.S. Energy Information Administration, Food and Agriculture Organization of the United Nations

oil prices represents a direct link towards the rise in transportation costs, since fuel represents as much as 50-60% of total shipping operation costs (Carbon, P, 2011). To add to the relationship between food and oil prices; as oil prices rise, so does the demand for biofuels, which are the only non fossil fuel able to replace petroleum products in existing combustion engines and motor vehicles. The issue with this is that bio fuels are often made from corn and other agricultural products, hence the demand for these alternative fuels increasing the demand and price of crops. Powerful companies come into these poor nations with the promise to boost their economy with jobs and provide greater incomes for those in poverty. Studies show otherwise that they are in fact, doing quite the opposite. Biofuels production is added to the ever growing difficulties policy makers have to combat the high rise of these food prices.

The difficulty of finding a median between economic prosperity and human rights and development is often very difficult for these developing nations. Be it struggles within the household to produce a sufficient diet for the family or competition outside the household to produce an income or find employment, families in developing countries are finding themselves stuck in the poverty cycle.

The Effects of Food Prices on Children and Poverty

Food is a necessity of life and must be purchased, no matter the cost. Unfortunately the opportunity costs of attaining food for millions of people around the world are very severe. In America where they spend, on average, less than 10% of their income on food, the rise in prices of food is more of an inconvenience due to the possibility of adapting to higher prices (Carbon, P., 2011). Food in North America is accessible and often taken for granted, but in countries where many live in poverty, it is a different case. In most developing countries, the poor can spend up to 70% of their income on food (International Monetary Fund, 2012). The social implications of rising food prices hold severe consequences for the poor. In some countries the lack of quantity and quality of food has caused many riots. These actions display the urgency of people to gain more affordable and applicable access to quality food for themselves and their families.

The quality and quantity of food in these underdeveloped nations has suffered, which contributes to the already struggling overall per capita health and wellness. Undernourishment increases disease and mortality, which lowers productivity and can have severe lifelong effects, particularly for children. Childhood is a stage of life that will affect and influence a person's well being for the rest of their lives. The period of childhood is arguably the most important time in a human's life, as it is when children can develop and grow, physically and mentally, in order to properly adapt to everyday life for years to come. The time period is short and finite, so a missed opportunity to properly develop as a child may be difficult to overcome and may hold irreversible effects later in life. A recommended healthy diet for kids is one with variety. This includes plenty of water, enough protein for growth and repair, adequate carbohydrates, and enough iron, calcium and vitamin D to strengthen bones and blood. Zinc and magnesium are also important to strengthen the immune system. The struggle for many kids to meet these nutritional guidelines will have a profound effect on their development. When the price of simple foods rise, such as rice, it is hard to follow an acceptable diet (Figure 3).

Figure 3

Source: The Rising Price of Rice. (Cyclone fuels rice price increase, 2008).

The impact of food prices on developing nations runs deeper than the obvious struggle to provide enough food for everyone. Price spikes will limit the ability of poor households to meet important non-food expenses, such as education and health care. The right to be educated at a

young age is important to the development of a human. However, the education one obtains in school does not necessarily determine whether or not one will survive. Food and water are the most important things for a human to live, therefore food and water become the primary priority for all people even if the cost prevents other important aspects of life. The opportunity costs of food are what poor families must endure every day, which will have a profound effect on their children.

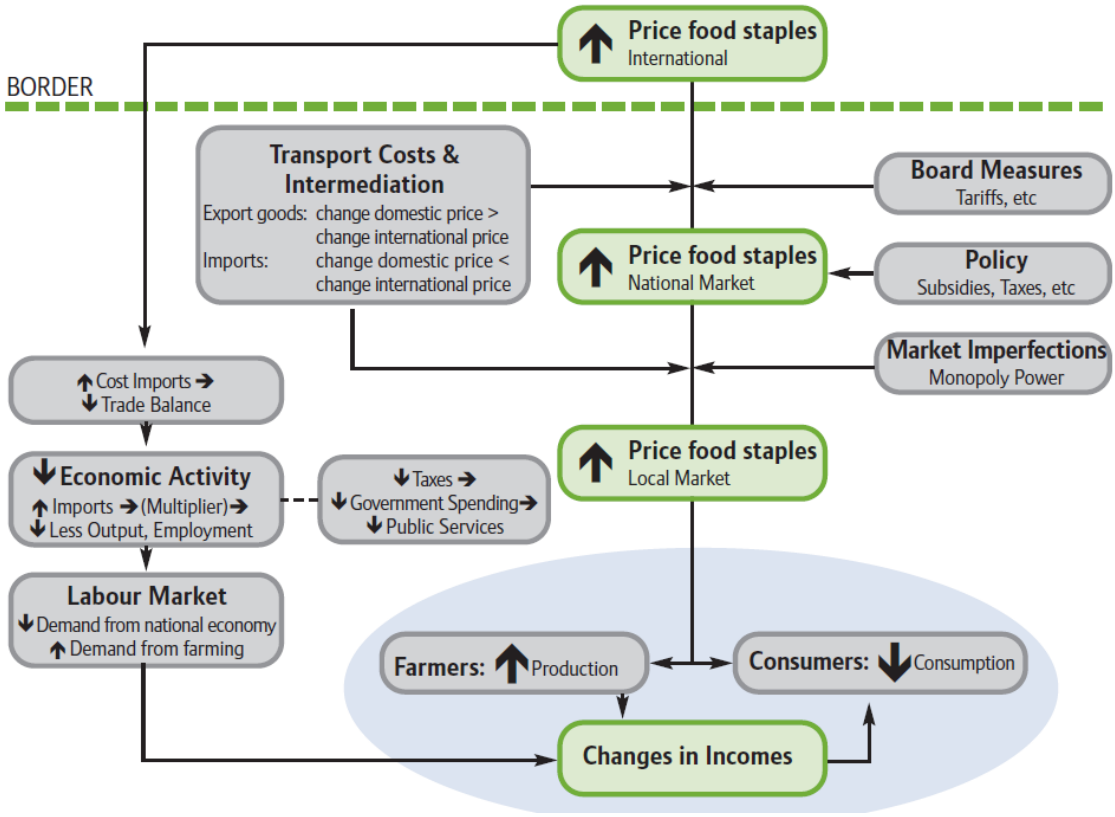
When food is unaffordable, families will do what it takes to put food on the table. Both parents often will seek employment and may be required to work longer hours to bring in more money. The additional income may be beneficial in many ways for children. Young children are often not properly breastfed, and a lack of proper supervision may occur. As food becomes more affordable a child in the family will become healthier and better nourished. However, this also means less time for childcare and other domestic responsibilities that will not be fulfilled, as both parents are spending their time working. The quantity and quality of caring time for children is very important in a child's development. Higher food prices may have important effects on a parent's time as they try and compensate for an increased household expenditure on food. The time a parent spends on providing an income to supply the meal is time that will not be spent caring for the children, and taking the necessary steps to help develop them with the likes of school and healthcare centers.

An unfortunate reality in many parts of the world is the gender bias towards men, and the desire of having a son rather than a daughter. In many cultures the daughter will come second to the son, and will be deprived of many beneficial things that can disrupt development. The daughter of a family will often take on extra responsibilities; motherly duties such as household chores and childcare in order to help the parents as they provide an income. These added responsibilities will prevent girls from participating in important developmental activities such as schooling. Girls are often not able to receive an equal opportunity to an education as males are. Of the 140 million children in the world who do not attend school, two thirds of them are girls (Osita-Oleribe, 2007). A lack of education will often deny a girl of the knowledge and applicable skills needed to live her life to her full potential. Educated women will have the necessary tools to live a more productive life and will in turn help them raise a healthier family. The fact that many poor families must spend their money on food, leaving little to no money on education is a

major problem in developing nations. Education provides tools for individuals in helping benefit society and bringing positive contributions to developing nations.

The higher cost of food leads to trade-offs that depress the level of activity in the economy. The higher costs potentially lead to lower government revenues that can result in less money spent on public services (Figure 4). Many children are already deprived of an education, but for the fortunate few who are not, they often receive a less than acceptable education. With less government revenue, teachers and school supplies become harder to pay for and will have a large impact on the citizens of its jurisdiction. The lack of revenue dollars will prevent a child from more than an education; healthcare will also take a major hit. As discussed earlier, the rise in price in food will potentially hinder a child's health and development, meaning that healthcare could potentially be vital to a child's survival. Most developing nations already lack hospitals and clinics to provide for their citizens, as money for trained doctors, nurses and necessary medical equipment is just not available. The fact that many children are indeed malnourished is very discouraging and the lack of proper medical care needs to be accounted for by individual states. More than 200 million children worldwide under the age of 5 do not receive basic healthcare, leading to 10 million deaths annually from treatable ailments (Associated Press, 2008). Basic healthcare interventions such as prenatal care, skilled assistance during birth, immunizations and treatment, are not being provided to many children in developing nations. This can be partially attributed to the result of the opportunity costs of food as it corners families and governing bodies into investing their money towards the best allocation for survival, so rising prices of food will limit their spending power for buying alternative goods and services.

Figure 4



Source: Economic Impacts of Rising Food Prices on a Developing Country (Holmes, R., Jones, N., & Wiggins, S., 2008).

An already difficult life style for children in developing countries will only get rougher while the price of food rises. The early years of a human's life are the most important years, as that is when growth and development takes place. Proper nutrition is crucial in a child's development, but the rise in food prices affect children in more ways than just their diets. A lack of proper education, healthcare and childcare are some areas a child may forfeit in order to receive enough food for survival.

Effects of Biofuel Production in Developing Countries

As the global population continues to grow, so does our thirst for energy. This thirst has nearly dried up the global supply of fossil fuels as they are used to power the majority of the machinery and vehicles used to sustain many of our man made necessities. As fossil fuels steadily dry up, the search for an alternate energy source is on. One fuel, which the developed nations have shown a significant interest in, is biofuel. Biofuel can be created from nearly any type of

vegetable oil, including oils that have already been used to fry food. This recycled fuel is loved by environmental enthusiasts alike, as there are no significant environmental disadvantages to using this product. While the idea that using these fuels in developed nations may seem to be a prosperous one, both environmentally and economically, the disadvantages often fall on the developing nations through the process of production of biofuel.

The market for biofuel has grown immensely and the supply of recycled fuel is unable to keep up with the demand. When there is high demand for a product, producers will often create as much supply as possible because money is now allocated to be spent on said product. This has lead to biofuel producers moving and creating many of their operations to developing nations due to the low cost of producing biofuel in these countries. Biofuel can be manufactured using a variety of different grains but two of the more popular sources are soybeans and corn. Soybeans and corn just so happen to be two important food sources that feed many in poverty, especially in developing nations. When these products are seen to be more profitable as a fuel source than a food source, the use is inevitably transferred. Each farm that is handed over for biofuel production leaves one less contributor to the already struggling food market. Lower supply often results in a higher price. This higher price then becomes unaffordable to a mass majority of the population in these developing nations.

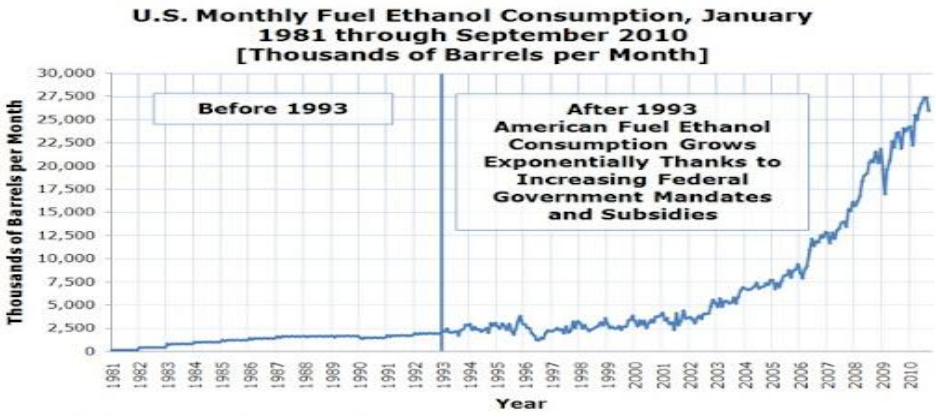
In developing nations prioritizing certain issues over others often is deemed to be very subjective. Developing and maintaining human rights such as the right to food and water can often be a less convenient option when trying to increase and economical gains and prosperity. Brazil is one example that has taken to biofuel production on a large scale in an effort to jumpstart their economy. Soybean plantations in Brazil have been growing at a rate of 15 percent annually (Trigona, 2007). The insertions of large companies taking over farms are resulting in a loss for local farms, which are now too small to compete to provide. In Argentina, the local governments seem to be in support of these evictions as they allow new companies coming into the country. When farmers fought against their evictions they were arrested and put in jail (Trigona). At an economical standpoint many of the large companies intruding into the local farmlands appear to be boosting the economy and helping the people in these countries. However, they are causing more harm than good by causing a disadvantage to the local farmers. This was apparent when farmers and other locals were seen protesting outside of biofuel

conferences in Argentina. The Argentinian people had a strong case too, as food prices are now estimated to rise 15 percent annually, a depleting and terrifying result for a country that has 30 percent of its population under the poverty line (Trigona). Job creation is produced through these companies coming in and producing, but the production they are creating is not beneficial to the locals. Although they are creating higher income per capita, the local foods that were brought from these farms before provided for low costs. The opportunity cost of allowing these companies to take over farming land is much higher for those in poverty and makes their lives much more difficult.

Ethanol, created from corn, is an example of a biofuel that has caused significant problems in the way of raising food prices and taking over land opportunities. The increased demand for corn as a fuel product has driven many farmers to convert and quit producing food. This has in turn made the price of corn increase, causing the diets of numerous citizens in developing countries to fluctuate. The increase in demand for ethanol provides local farmers profits to increase in corn production solely. This then results in the local farmers allocating the majority of their farmland to the production of corn and are in turn abandon their production of other grown goods. With now a low supply of these other grown goods and the demand the same, the prices of these foods now increase and often become unaffordable for local citizens to purchase. The Association of American Physicians and Surgeons released a warning that the U.S. and European policy to increase ethanol usage passed what was consumed in 2004 could lead to nearly 200, 000 deaths.

Moving passed the levels shown in 2004 (Figure 5) will drive roughly 35 million people into absolute poverty in developing countries (Rice, 2011). With the direct transfer of corn from food to fuel it is becoming more and more difficult for these struggling countries to find nourishment. In one year the price of corn nearly doubled with the demand for biofuel still growing (Rice 2011). Some advocate the idea that the increase in incomes for local workers from these plantations will eventually offset the poverty level and give more money back to the people who are currently unable to afford proper nourishment. While this argument cannot really be disputed completely, it is clear that when these impoverished people are spending eighty percent of their income on food, the answer and action taken to this issue needs to be supportive of current conditions as well (Rice 2011).

Figure 5

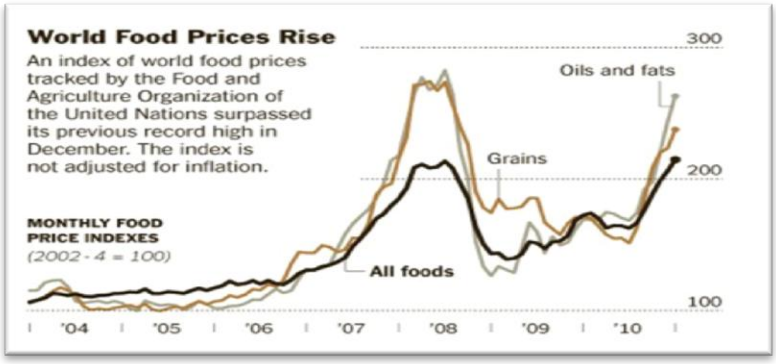


Source: Energy Information Agency, Fuel Ethanol Overview

www.eia.doe.gov/mer_data.asp?_table=T10.03

The proportion of corn produced in the United States that is used for ethanol production has grown from five percent to twenty five percent over the last decade (Msangi, 2008). Developed nations are unable to produce enough corn and soybeans within their own borders causing them to look to foreign land in the developing nations. The developed nations' thirst for energy and power has forced the developing countries to carry a significant portion of the burden while reaping few of the rewards from their part. The International Food Policy Research Institute has estimated that the price of corn will rise by twenty percent in 2020 (Msangi 2008). The increase in the price of corn is much too great for developing nations to keep up and it shows no signs of slowing down (Figure 6).

Figure 6



Source: Food and Agriculture Organization of the United Nations

http://gulzar05.blogspot.ca/2011/01/more-on-indias-volatile-inflation-story.html

The increase could continue to even rise exponentially over the next several decades because developed nations have become much more environmentally aware making this issue much more relevant to them in comparison to the well being of those who are affected through the production. Biofuels have become heavily marketed throughout developed nations as the perfect fix to environmental issues, caused by crude oil, due to the limited negative environmental effects of biofuels. These large companies can easily do this because consumers are unaware of the negative effects, as it is not often broadcasted in the mainstream media. The ethanol being consumed in any developed country is often being produced in developing nations like Brazil, in locations often far away from its original production. Meanwhile, the companies producing the fuel are taking food from local citizens and raising the prices on what is left. As fuel consumption continues to move from fossil fuels to bio fuels, it will be the undeveloped nations that struggle to stay afloat while the price of their food continues to rise.

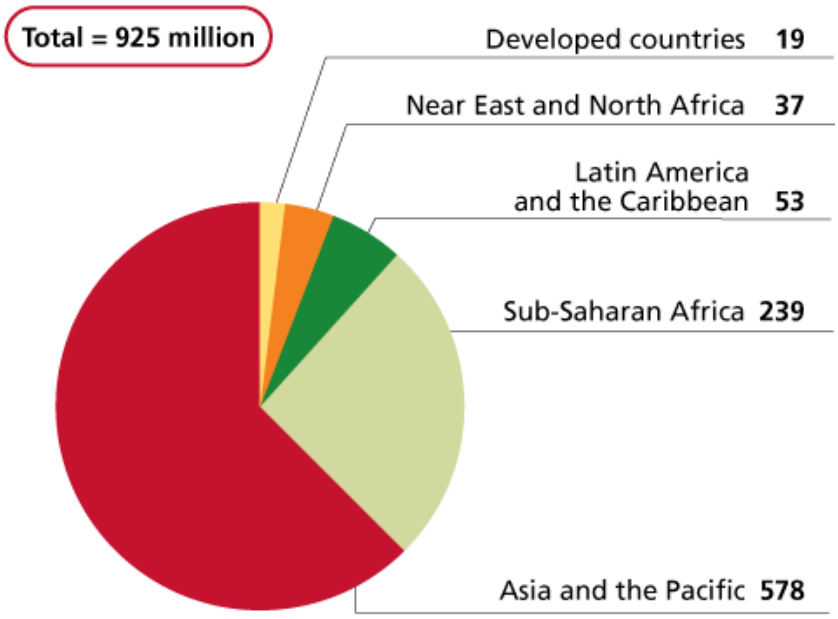
These struggling countries are constantly allowing large firms to move in and push out their current farms since they believe they are boosting their economy. It is clear that they are bringing more money and profit into each municipality, but the well-being of people in the area are often left outside the picture. The large producers are able to provide biofuels to the masses as they are taking advantage of very low labor wages, which is why they choose to come to these developing nations. These producers do not always necessarily care about the prosperity of local communities, as these multinational and multimillionaire companies often need to provide their shareholders with the best results financially. When best results are needed in the financial field this often leads to other important factors to be ignorantly disposed of and developing nations take much of this burden.

Families are forced to give up their farms that have been sustaining them for years and men and women are then funneled into factory jobs where they earn a minimum wage. This minuscule wage along with the constant increase of food prices is forcing many people in developing nations into the poverty cycle. The biofuel case as a cause to the global food crisis is simply another example of developing nations being overly powerful for financial gains and often ignorant to the needs of the many in poverty. It is become more known that creating these plantations is not helping out these people yet nothing is being changed. The overproduction and

overconsumption of developed nations has become much greater than harm to simply developed nations, it has now become a burden on developing nations as well.

Obesity rates continue to climb in North America and Europe showing that the food crisis may not necessarily be global in the manner in which it is showcased. Wealthy nations are over eating and over using, forcing the rest of the world to carry the weight. The amount of people starving around the globe is highlighted in the following graph (Figure 7), showing just how much of a burden these countries really are carrying. Developed nations are carrying a mere two percent of the worlds starving people. This makes it nearly impossible for the citizens of these countries to understand the pain hunger causes. The fact that we are taking food from these people as a method of powering our vehicles is shown to be completely absurd. Other options need to be researched because this is not a way to save the earth; this information shows quite the contrary. The externalities faced with biofuel are far too great to be swept under the rug.

Figure 7



Source: 2012 World Hunger and Poverty Facts and Statistics

http://www.worldhunger.org/articles/Learn/world%20hunger%20facts%202002.htm

The developed nations have exhausted the majority of their resources and their land. This has led them to expand into developing nations, forcing these countries to carry the burden of sustaining our luxuries.

The Contrast between Developed and Developing Countries

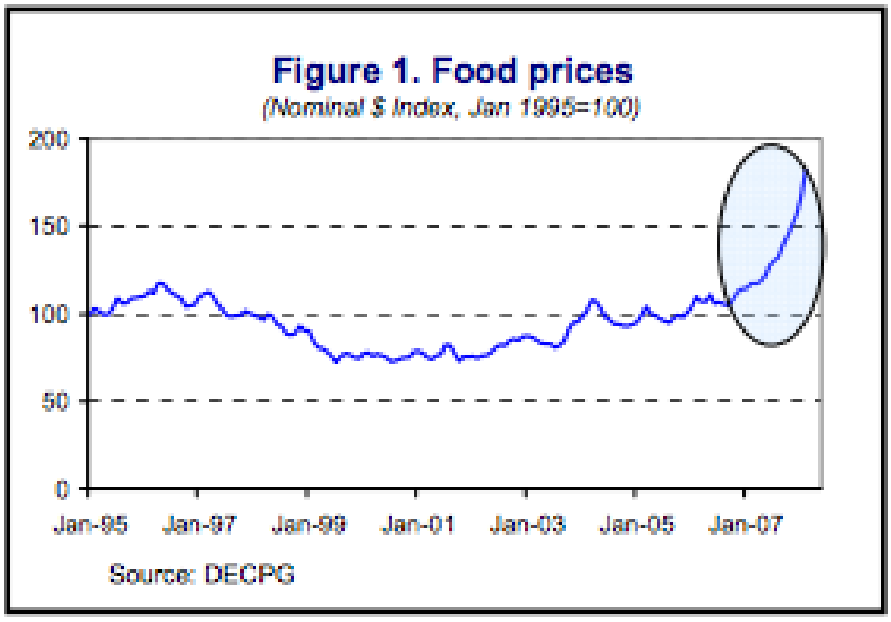
The distributional impacts of rising food prices can often be serious in countries where the balance of payments have not been adversely affected. While some people benefit from higher prices, most are harmed from the effects. This is dependent on whether they are net producers or consumers of the food staple (the dominant portions of regular diet consisting of corn, wheat and rice) and the extent to which wages adjust to higher food price inflation. The World Bank warned that a total of thirty-three nations across the world were at severe risk of social unrest due to the rising food prices in 2008. Not only were the poor nations faced with greater problems as a result of the global food crisis, developed nations were also faced with unaffordable food prices.

For developing nations, the rise in food prices meant the possibility of mortality rates increasing because of diseases caused by hunger and malnutrition. Countries that mainly imported goods such as Haiti and West Africa were among those to first feel the devastating effects. The price of bread doubled in one year making it even more difficult for those families living on less than $1 a day (Singapore, 2008). The poorest households, which included many female-headed households, were now in trouble because the family income was solely dependent on that of the mother (or any single parent household) and the majority of the money would go to buying food. This deeply affects overall credit and savings that the family may have had. According to an article in the New York Times, 73% of Nigerian and 65% of Vietnamese total budgets were spent on food. Using a sample of household data for eight different developing nations, Ivanic and Martin (2008), analyze the impacts of higher food prices on poverty. They take into account impacts from changes in commodity prices, and impacts through changes in wage rates for unskilled labor. Results show that in six of the eight countries looked at, between 2005 and 2007 price increases for staple foods were directly associated with a rise in poverty. It is estimated to have increased by three percent (Ivanic and Martin 2008). Analysis using an alternative price index weighted according to the consumption patterns of the poor in Latin America suggests that in most countries of the region, the effective inflation rate faced by the poor is higher than the official rate, by three percent (World Bank, 2012).

Some developing nations began to ban exports to other countries in fear of starvation of the people. India and Egypt both banned certain rice exports; Vietnam, the third largest rice producer-halted exports to try and slow inflation. China, the world's number one producer of grain also stopped exports.

Rising food prices also affect the richer, developed nations. According to a New York Times Article there was a large increase in the number of working adults who were no longer able to financially support their families. These people can be classified as "the working poor." With food being as expensive as it has become, some families are often faced with having to choose between the need to eat and the need to heat their homes. A total of sixteen percent of income in the United States goes towards food as well as a shocking twenty-eight percent in China and thirty-three percent in India (New York Times, 2008). According to a survey done by the Overseas Development Institute, almost all households that took part in the survey reported that they had been cutting back on various expenditure items as well as eating cheaper and less nutritious food. Urban households consumed more food off "the street" than at home due to economies of scale. Some families began to pawn off valuables or took on extra work in order to protect their assets and make ends meet (Singapore, 2008). New York City reported a seventy-three percent increase in the number of full time workers that required help with food at the food bank (Singapore 2008). Many families were left with no support and had to cope on their own with the rising food prices as support from the community and government declined. In 2008 United States export prices rose from $375/ton in January to $440/ton in March and Thai rice export prices increased from $365/ton to $562/ton (World Bank 2008). This came on top of an one hundred and eighty-one percent increase in global wheat prices over the thirty-six months leading up to February 2008, and an eighty-three percent increase in overall global food prices over the same time period (World Bank 2008) (See figure 1).

Figure 1



Source: http://siteresources.worldbank.org/NEWS/Resources/risingfoodprices_backgrou ndnote_apr08.pdf

To help these struggling families in both developing and developed nations food-work programs have been established. School feeding programs have also been implemented to improve the overall food intake of school-aged children. However, mainly in developing nations this typically does not address the problem of child malnutrition, as the most critical point is when the child is still an infant. For developed nations where infants tend to receive better care and do not grow up malnourished, the school feeding programs benefits those students who go to school hungry. To try and stop the problem of food price increases, agricultural productivity must significantly in developing nations. Richer countries financing a "green revolution" to increase overall productivity and raise crop yields could do this. The assistance needed by these underdeveloped nations is severely lacking as developed and industrial nations have become significantly less generous. An article in The New York Times reported that overseas aid by developed nations had decreased by approximately eight percent. In 2008, The World Food Program said rising grain costs put a costly hole of $500 million in its food budget in order to help victims suffering of hunger worldwide.

Even with the vast number of current international food aid programs nations are still greatly affected by the global food crisis, with developing nations being much worse off. Continued growth of the middle class, the continuous push for renewable resources and fuels, along with anticipated damage to agricultural production due to global warming mean that food prices are likely to remain high. People in developing nations will continue to need aid in order to avoid malnutrition.

Conclusion

The food crisis is a matter of helping the people of now, as well as providing a system to help stabilize an affordable healthy diet in the long run. The causes of the rise of high food prices will only help raise the prices even more if correct policy and regulations are not set to provide aid to the less fortunate. Global Food Security released a policy report *Price Volatility in Food and Agricultural Markets: Policy Responses* released in June 2011 that stated, "G20 leaders at their summit meeting in November 2010 requested FAO, IFAD, IMF, OECD, UNCTAD, WFP, the World Bank and the WTO to work with key stakeholders 'to develop options for G20 consideration on how to better mitigate and manage the risks associated with the price volatility of food and other agriculture commodities, without distorting market behaviour, ultimately to protect the most vulnerable." A viable effort is being made by developing and developed nations alike to combat this issue, but until these considerations are put into action the foreseeable future entails higher food prices. The World Food Programme 2012 offers one of the best and simple ways to help vulnerable countries with rising food prices and to provide stable long-term food production with their "Five Point Action Plan on Food Prices" , which includes:

> **1. Develop emergency food reserves systems**. This can be done by scaling up WFP's existing advance purchase and pre-positioning facilities, allowing access for WFP to national and regional food stocks during crisis, and building up small regional food reserve systems under WFP management.
>
> **2. Scale up social protection safety nets**. Such as mother/child nutrition, school meals, and job creation programs – whether food- or cash-based, depending on market conditions – to protect the most vulnerable people.

3. Support smallholder, women farmers. To reduce their vulnerability and help smallholders become a bigger part of the supply solution to food security, including by leveraging local purchases by WFP (P4P) to promote smallholder production and build local market infrastructure.

4. Strengthen commitments made at 2009 Rome summit to exempt humanitarian food from export bans, restrictions or extraordinary taxes. A code of good conduct which explicitly allows exemptions for WFP food purchases.

5. Set up a multilateral mechanism to improve analysis of food prices, production and stocks to support the G20 efforts to enhance transparency of food markets.

Through this program the major issues are covered and a plan to overcome these issues is strategically laid out to not only provide results short-term, but also more importantly for long-term. There continues to be hope for all nations around the world that food prices will someday decrease. Until then families continue to be faced with un-settling uncertainty, when and where their next meal will come from.

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2 The Current State of Food Security in sub-Saharan Africa, Southeast Asia and Latin America & the Caribbean

Jennifer Giesbrecht, Peter Moorman and Carys Pinches

Introduction

The issue of food security is an extremely relevant issue in current development discourse, and will be the focus of our study. The FAO (2006) defines food security as a state when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". The motivation behind choosing this topic stems from the fact that food security is, and will increasingly become, an important aspect of structural change within developing regions. With rising population numbers, and threats of intensified extreme events due to climate change, access to food will become ever more difficult for many impoverished and marginalized people. Poor access to food results in malnutrition and a subsequent reduction in human capital, one of the barriers to structural change. The nature of food security in a given region, therefore, is indicative of its overall health, social and economic development. We will be exploring the nature of these problems by comparing three different regions of the world that are currently struggling to ameliorate their status of food security. These regions are: sub-Saharan Africa, Southeast Asia, and Latin America & the Caribbean. The parameters of this study fall into three categories: availability, accessibility and utilization of food. FAO (2006) defines food availability as access to sufficient quantities of food of appropriate quality, supplied through domestic production or imports". Food accessibility refers to "access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal political economic and social arrangements of the community in which they live" (FAO, 2006, p.1). Utilization can be defined as ensuring that physiological needs are met through "nutritional well-being" (FAO, 2006, p.1). The purpose of using these three categories is to provide a basis for comparison between each different region.

Availability

Sub-Saharan Africa

The precarious nature of food availability contributes greatly to food insecurity in sub-Saharan Africa. Although 44.6% of the region's land base is available for agricultural use (World Bank, 2009), crop failure due to climate conditions and environmental degradation is prevalent. Not only is the region prone to notable rainfall variability, it is also subject to El Nino conditions which result in "extreme weather events such as drought and floods" (Haile, 2005, p. 2169). It has been suggested that climate change will further exacerbate these existing extreme weather conditions. Furthermore, Hansen, Mason, Sun & Tall (2011) suggest that poor seasonal forecasting mechanisms in sub-Saharan Africa contribute to crop failure. A lack of forecast gives farmers minimal warning in the event of extreme weather, thus limiting time for farmers to take necessary precautions to protect crops. In terms of long-term preparation, the lack of weather forecasting also disadvantages farmers in the region as they have inadequate information about future weather and climate conditions for upcoming growing seasons.

In addition to unfavorable climate conditions, land degradation is another issue that has notable ramifications for food availability in sub-Saharan Africa. Early development initiatives in the 1950s and 1960s sought to industrialize the agricultural sector. The promotion of large-scale farming resulted in overproduction on the land and contributed greatly to loss of soil fertility. Consequently, farmers are forced to grow crops on marginal lands, which in turn further diminishes the quality of the soil. Agriculture on increasingly degraded land is one of the primary reasons for declining crop productivity in sub-Saharan Africa (Sileshi, Akinnifesi, Legesse, Beedy, Oluvede & Mong'omba, 2010). According to Sileshi et al. (2010), maize contributes to over 50% of local crops. However, due to poor soil conditions, production is not able to satisfy local consumption rates. Given the extensive local demand for maize, farmers are forced to continuously grow the crop, mining organic soil matter, further reducing soil

fertility. Although fertilizer is an appropriate means to improve soil conditions, it is largely unavailable to sub-Saharan African farmers due to rapid price increases (Sileshi et al., 2010).

Population growth is another condition that further facilitates land degradation. The regional population is increasing at a rate of 2.5% a year, significantly increasing pressure for farmers to produce high yield crops (World Bank, 2010). In addition, expanding populations further deplete agricultural land as they encroach on “marginal lands, fallows and protected areas” (Drechsel, Kunze & Vrise, 2001). Given that 62.2% of the population in sub-Saharan Africa lives in rural areas, crop failure is particularly devastating as a significant proportion of the population relies on subsistence farming as a primary food source.

Southeast Asia

The persistence of climactic extremes in Southeast Asia is a significant determinant of food availability at both the regional and the sub-national level. This is due to more hostile environments being far less likely to foster the growth of sufficient quantities of food than those that maintain a relatively stable climate. The United Nations Economic and Social Commission for Asia and the Pacific have referred to communities that are particularly vulnerable to fluctuations in food availability as "arable margin areas". Some regional examples of arable margin areas include North Eastern Thailand, which is highly prone to droughts, and coastal areas of Vietnam and the Philippines, which are prone to typhoons (UNESCAP, n.d). During extreme climactic events, such as droughts and typhoons, there is a sufficient reduction in the amount of goods produced in the area, thereby prolonging the "hungry season", the period before harvest. Studies from different regions have found that droughts have implications beyond the one season, for if the farmer has inadequate access to food for one season; this can reduce their capacity to work the following season due to poor nutritional status. This reduction in human capital could have a domino effect on reducing yields on a seasonal basis, which proves worrisome for the future status of food availability (Hlanze et al., 2005).

The intensity of such extreme events is likely to increase in the future with climate change projections, which also calls for innovations to help curb the impact on agriculture in Southeast Asia. Implications that stem from climate change are already being experienced, and prove to be detrimental to agriculture in the region. In Indonesia, for example, rainfall during the monsoon season has been especially high, while rainfall during the dry season has decreased significantly. Additionally, "the number of floods and storms increased; [the] number of hot days and warm nights increased [and the] intensity and frequency of heat waves and forest fires increased" (Baxter, 2012, p.38). A reduction in rainfall and an intensification of extreme events have also been prevalent in Thailand and Vietnam (Baxter, 2012). Therefore, there is an irrefutable relationship between climate and food production, which seems to suggest that future yields will decrease dramatically (Singh et al., 2011).

Similar to Sub-Saharan Africa, the population in Southeast Asia is continuing to increase steadily, which has important implications for food availability in the region. For, as the number of mouths to be fed increases, farmers are forced to produce more food on the same land. This often results in more intensive farming, which has implications for land degradation, as seen in the other regions. As a result, these different factors can turn into a vicious cycle whereby as population increases, so too does soil degradation, which decreases the amount of food available (Douglas, 2006).

What is more, as a middle class has begun to emerge in the middle-income countries of Southeast Asia, spending power has increased; resulting in an increase in demand for different types of food (see Figure 1). The creation of a middle class has been mostly a consequence of structural change in these countries away from farming and towards more manufacturing and service sector employment. Implications from this shift have occurred in Thailand in a somewhat negative way. Structural changes within the country's economy suggest that the country's GDP has increasingly become shaped by the export of material goods and services rather than

agricultural products. As a result, younger generations have become less likely to enter the agricultural sector for employment due to it being less lucrative than newer employment opportunities. Thus, not only are issues surrounding food availability linked to climactic or biological factors, but there is also a necessity for adequate numbers of farmers to grow crops (Supaphol, 2010). In an effort to counter this trend of urbanization, the Faculty of Agriculture at Kasetsart University implemented programs to encourage younger generations to consider agriculture as a career choice. Continued employment in the agriculture industry is crucial now and into the future to ensure continued, sustainable food production (Supaphol, 2010).

During the mid-1960s, in an effort to improve the production of staple foods in more volatile regions, intensive research took place in Southeast Asia to develop a crop that would be less vulnerable to climactic and biological extremes. One such development was the invention of high yield variety (HYV) rice and wheat, which promised much higher yields than traditional strains. The adoption of HYV crops grew with force across Southeast Asia, at a rate one and half times that of the rest of the world. This had a significant impact on the availability of some of the most important foods consumed by the people of Southeast Asia (see Figure 2). Between 1980 and 2000, for example, production per hectare rose by 114% in Vietnam, a country that before had been struggling to feed its ever-increasing population (UNESCAP, n.d.). Additionally, other sectors, such as poultry, became more adept at producing higher quantities of meat. While in the past poultry was farmed on a relatively small scale, in recent years there has been a structural change from "horizontal to vertical integration" (UNESCAP, n.d., p.40). What this means is that there is now a link between "farms growing animal feeds, to feed mills, to slaughterhouses, to processing plants and to food stores", making the production more efficient and increasing availability (UNESCAP, n.d., p.40).

Latin America & the Caribbean

The high abundance of arable land and the constant growth that Latin America & the Caribbean have experienced in their agricultural sectors have resulted in an increased availability of food. This rise in food production is crucial for its capacity to grow the economic sector of the region by providing more job opportunities and greater exports. Furthermore, it serves the role of decreasing food insecurity by easing pressure on food systems brought on by an increase in population size. With an estimated 576 million hectares of arable land, the region has the biggest of such reserves in the world (UNEP, 2002). Latin America & the Caribbean have been able to capitalize on their natural resources, surpassing many developing regions in their ability to provide food for their population as a whole. Relative to other developing regions, Latin America & the Caribbean has experienced the highest growth rate in agricultural productivity, with a 1.9% increase between 1961 and 2007 (Ludena, 2010). This increase not only has direct impacts within the region itself, by being able to provide food security to more people, but also creates significant economic exporting opportunities due to excess food.

Of all agricultural growth in Latin America & the Caribbean, the vast majority is accounted for by technological change and not by efficiency changes in production (see Figure 3). These gains in agricultural productivity are associated with the implementation of cost-saving technologies such as genetically modified crops (GMC's), zero tillage, and the use of Global Positioning Systems (GPS's) for more productive fertilizing and harvesting (Ludena, 2010). Although these intensive food practices yield significant increases in food production, as seen in Figures 4 and 5, there are still many health concerns and other consequences associated with these technological innovations.

Availability of food is not solely in the present context of supplying food, but also the future use of agricultural land and other food production systems. The consequences of climate change could have a dramatic impact on future production growth in agriculture, as repercussions could include melting glaciers, increased precipitation, and more sporadic extreme weather events, as in Southeast Asia (Nelson, 2009). The Caribbean is especially vulnerable to such changes as agricultural production only grew at an annual rate of 0.5% between 1961 and 2007 (Ludena, 2010). This is due to its agricultural production being aggravated by changes in the rain cycles and higher temperatures. As an example, an increase of 10% to 20% in precipitation, and of only 1 or 2 degrees in temperature, would reduce the production of broad beans, rice, and maize by 10% (Martinez, Palma, Atalah & Pinheiro, 2009). These climactic changes, coupled with a slow growth rate in their agricultural sector, would result in a severe reduction of food in the region and an increase in food insecurity.

Climate change is not only projected to negatively impact the agricultural sector, but also many other food production systems, including forestry, aquaculture and fisheries. The rising temperature and other effects caused by climate change could significantly alter the present physicality of the land, which would impact future production of food for its population. Figure 6 shows the projected trends of climate change and its effect on primary production in Latin America & the Caribbean. Increased salinization and desertification of agricultural lands, additional wildfires in forests, and reduction of water availability from shrinking glaciers all contribute to the reduction of primary production of food. Studies have also suggested that agricultural productivity in South America would fall between 12% and 50% by 2100 due to climate change (UNCSD, 2011 p. 96). In addition, climate change affects more then just the availability of food by reducing production capacities, but also it reduces the accessibility of

food. For example, an 18% of drop in agricultural productivity in Brazil would increase the rural poverty by 3.2% (UNCSD, 2011 p. 96).

Accessibility

Sub-Saharan Africa

As previously discussed, subsistence farming is the primary means of food production in sub-Saharan Africa. However, as food availability is a very precarious issue, the region is prone to a high prevalence of household poverty. The widespread unemployment and vulnerability severely limits available social security and coping mechanisms for families in the event of famine, conflict or market shocks. Furthermore, as local food production is relatively unreliable, households in sub-Saharan Africa are forced to supplement food supply with foreign imports. This reliance on imports is particularly evident in the weeks previous to harvest before local crops have been cultivated, the aforementioned "hungry season". However, this dependence on foreign food imports is problematic as it exposes the vulnerable region to fluctuating global food prices and inflation. For instance, as previously mentioned, maize production is unable to meet local demands and consequently many sub-Saharan African countries are forced to import up to ten million tonnes each year. As shown in the following diagram, the cost of maize has been steadily increasing, reducing the quantity of maize that can be purchased for a set price. Inflation combined with unemployment and minimal income greatly limits the ability of many households to purchase food. Moreover, it is challenging for sub-Saharan African farmers to sell crops on global markets as developed economies have established protectionist policies such as tariffs and subsidies on agricultural sectors (Kandiero & Rando, 2004). Arguably, the nature of food insecurity in sub-Saharan Africa demonstrates how the cycle of poverty operates in the agricultural population. Sub-Saharan African farmers are unable to penetrate foreign food markets, severely limiting income-earning ability. Additionally, the insecure nature of local food availability often forces farmers to rely on foreign imports. However, inflation and lack of income limits household food accessibility.

Maize: Producer Price (US$/tonne)(USD)

Source: FAO, n.d.

In addition to poverty, gender inequality is another issue regarding the nature of food security in sub-Saharan Africa. Food production, preparation and consumption are highly gendered activities. According to Hyder et. al (2005), rural women farmers have a very low social status. Women in sub-Saharan Africa "own 1% of land, receive less than 7% of farm extension services, receive less than 10% of the credit given to small farmers and are undernourished and illiterate" (Hyder, et al., 2005, p. 328). While men harvest cash crops, women farmers primarily work in the informal sector participating in subsistence farming as a means to feed themselves and their families. Furthermore, Hyder et al. argue that food security activities not only involve the cultivation of crops, but also "processing activities such as clod breaking, seed sorting, treatment, transplanting, weeding harvesting and storing" (2005, p. 328). These activities in addition to household food preparation activities are primarily the role of women in the region. These hugely time consuming tasks have been linked to health implications as well as an "inability to participate in decision making activities" (Hyder, et al., 2005, p. 333).

Southeast Asia

Poverty is a particularly significant indicator of groups or areas that have poor food accessibility. For example, in Indonesia it is estimated that by increasing the price of rice by 10%, the spending power of the poorest 10% of the population is reduced by 2% (UNESCAP, n.d.). There are several sections of the population in Southeast Asia that are particularly impoverished, and therefore have trouble accessing adequate quantities of good quality food. Firstly, those living in rural areas are much more vulnerable to food inaccessibility than those in urban areas. Inhabitants of rural areas, especially children, are significantly more likely to be underweight than those of urban areas due mostly to economic and physical barriers to the market place (UNESCAP, n.d.). That is to say, people living in rural regions earn much less than urban inhabitants and may have transportation difficulties in getting to market. Therefore, they cannot afford as much food, and what food they can afford is often of poor nutritional value. What is more, families living in rural areas tend to be much larger than those in urban areas, which means that they must support more people on a lower wage and less food. People, therefore, end up eating significantly less, which can cause a myriad of problems in later life (Rosegrant et al., 2001).

A second particularly vulnerable group to food inaccessibility in Southeast Asia is migrant workers. Migrant workers are extremely common in Thailand from Lao PDR and Myanmar, as well as in Malaysia from lower-income countries in the region. The majority of migrant workers coming to these middle-income countries work in the informal sector, and are therefore not protected by labor regulations. As a result, they are often paid much less than other formal employees in the cities, which makes this section of society particularly vulnerable to increases in food prices. Increases in food prices are particularly common in years where climactic extremes have impacted food production. Thus, the food they can afford is very little, and is often not of sufficient nutritional value (UNESCAP, n.d.)

Minority or tribal groups are vulnerable to food inaccessibility due to political barriers. In addition, these populations reside mostly outside of urban centres, and therefore experience many of the same problems as rural populations. Historically, these groups relied on traditional land for food collection and hunting; however, when dominant groups came to power, they lost these areas and have

become extremely marginalized. Most tribal groups are not employed formally and therefore have low wages, which is compounded by the inability to grow crops or hunt for subsistence due to deforestation. The underlying theme for each of these groups is not that there is a lack available food, but rather that they are the most impoverished, marginalized sections of the society and therefore cannot afford what food is available. Some families are forced; as a result, to take children out of school to work, to sell any assets they may own or to marry daughters, so that they don't have to feed so many people. Poverty and food insecurity, as demonstrated here, therefore go hand in hand (UNESCAP, n.d.).

Finally, gender is an important factor that impacts food accessibility in Southeast Asian communities. Generally, homes headed by a female often have less accessibility to food than those headed by males. It is important to note that Southeast Asia does not have as prevalent gender biases within the home as in South Asia; however, on a national scale women continue to be paid much less than males. As a result, households with women as the predominant worker are less likely to have access to food because they simply cannot afford adequate quantities of food, let alone those of sufficient quality. Female-headed households often occur as a result of men and sons leaving their rural villages in order to find work elsewhere (UNESCAP, n.d.). In the meantime, women care for the agricultural land, and it is estimated that women, "contribute to about 65% of total food production" in rural areas. However, because they have poor access to "resources such as credit, land, agricultural inputs and extension services and employment", women are often left with poor accessibility because they cannot expand crops to increase yields or sell surplus at the market (UNESCAP, n.d., p. 33).

Latin America & the Caribbean

A huge barrier in a population's access to food is the market conditions of the economy. With high inflation and increasing prices of commodities, a low-income family may not be able to afford the commodities they need. The 2006 to 2008 global financial crisis can be used as an analogy for the ongoing price inflation crisis in Latin America & the Caribbean. During the crisis, a main factor that caused widespread food insecurity was the speed at which the price of

commodities rose, making it difficult for the governments to implement policy adjustments in time (Pinheiro, Bianchi, Uzquiza & Trucco, 2010). For example, during the crisis, the price of wheat, maize, beef, and bananas increased 152%, 122%, 20%, and 24% respectively (Pinheiro, et al., 2010). These high inflation rates on basic commodities resulted in families having to spend more income on food, and less on other basic amenities, such as shelter, clothes, and health commodities. For example, the average proportion of income spent on food ranges from 22.5% in Chile, which is comparable to developed countries, to 57.5% in Haiti. This food crisis had heavy political impacts, as it gave awareness to the fact that food security is closely associated to food production and food supply (Pinheiro, et al., 2010).

Although the 2006 to 2008 food crisis presented the highest inflation rates seen in the past decades, commodity prices are continually rising and presenting similar constraints on families in the region. As Figure 7 illustrates, the increasing prices of food and other commodities have been steadily rising even after the food crisis. For example, in the last year the price of cereals, being the main source of calories for the population, were 36% higher as of August 2011, compared to August 2010. In addition, the two most important crops, wheat and maize, experienced price increases of 62% and 104% respectively within the past year alone (FAO, 2011). With rising inflation prices of basic commodities, there has been an increase in the number of households that can no longer afford to provide their families with these commodities, making them fall into food insecurity.

With the increasing inflation rates of commodities, many families have been unable to afford the basic commodities that they need. To help combat against food insecurity, many governments in Latin America & the Caribbean have introduced a wide variety of food programs. These programs seek ensure proper nutrition and access to food, and cost more than

US $1.6 billion annually to subsidize or provide food for people at risk of malnutrition (Musgrove, 1993 p. 31). There are a large number of food programs in the region, with varying sizes, which can be broken up into 3 categories: take-home programs, direct-feeding programs, and subsidy programs (Musgrove, 1993 p. 31). Figure 8 shows the amount of programs per country and the total amount of beneficiaries receiving care from these programs. Although these food programs help elevate pressure on families, in many countries where food insecurity is especially problematic, the food programs actually do not cover very many beneficiaries. In Haiti, where the food shortage and malnutrition levels are very high, only 9% of children under the age of 5 receive care, compared to a 96% coverage rate in Chile (Musgrove, 1993 p. 31). Also, only 7% of children in the Dominican Republic receive food programs at school, compared to almost 100% of school children in Brazil. These fluctuations between countries show that although many children and families are helped, it is the more well off countries in the region that benefit most. This problem is tied with governance and political policies, as well as resource endowment, with only around 0.2% of these countries' GDP going towards putting in place such programs.

Utilization

Sub-Saharan Africa

In sub-Saharan Africa widespread hunger and malnutrition are the two primary concerns regarding food utilization. Hunger is generally associated with a lack of energy, while malnutrition refers to an imbalance of nutrients (A. Kumar, personal communication, March, 2012). According to FAO, approximately 218 million people, or 30% of the population in Africa are suffering from chronic conditions of hunger and malnutrition (2009). This number is projected to increase to 300 million by 2020

(Rukuni, 2002). Furthermore, undernutrition contributes to 3.5 million child deaths every year (WHO, 2009).

The following table demonstrates that generally, many countries in sub-Saharan Africa appear to be fulfilling the required caloric intake. However, people in sub-Saharan Africa seem to be consuming the minimum, in comparison to developed countries, such as Canada, where people generally greatly exceeding daily requirements. Chronic hunger can generally be attributed to previously discussed circumstances such as a lack of availability and access to food.

	Dietary Energy (kcal/person/day)	
	Required	Consumed
Uganda	1710	2220
Sudan	1780	2280
Sierra Leone	1750	2120
Rwanda	1710	2090
Canada	1950	3530

Source: FAO, 2007

As shown in the following chart, diet in sub-Saharan Africa is primarily carbohydrate based with starches making up over 70% of food intake. This is unsurprising given the high production of carbohydrates grown in the region and the relatively low cost. The chart demonstrates that developed regions generally show a greater balance between carbohydrates, proteins and fats. While carbohydrates are effective in alleviating hunger concerns, they do not ensure that individuals are obtaining all required nutrients.

	Diet Composition (share in total dietary energy consumption (percent)	
	SSA	Developed Regions
Carbohydrates	71	51
Protein	10	12
Fats	19	37

Source: FAO. 2007

Micronutrient deficiencies are widespread in sub-Saharan Africa due to diets lacking in micronutrients. Vitamin A, iodine, iron and zinc are common deficiencies in the region. Although symptoms are problematic for everyone, micronutrient deficiencies are most harmful for pregnant women and infants (WHO, 2012). Specifically, a diet lacking in iodine can result in "impaired cognitive development in children" while a diet lacking in Vitamin A can cause preventable blindness in children and night blindness in pregnant women (WHO, 2012). Zinc deficiency is associated with stunted growth, impaired immunity and skin disorders while a lack of iron can result in poor pregnancy outcome, increased child morbidity and a reduction in work productivity (WHO, 2012). Although these conditions are severe, they are preventable with the administration of essential nutrients.

Southeast Asia

In western countries, it has become generally acceptable to judge "food adequacy" on the ability to obtain 2300 kcal per person per day. All middle-income countries in Southeast Asia, except Vietnam, were able to reach this goal by the 1990s due to a shift in diets from carbohydrates to more vegetables, as shown by Figure 9 (FAO, n.d.). This transformation has been coined "westernization", and is extremely important to ensure proper utilization of food that is available and accessible (UNESCAP, n.d.). There are several factors to take into consideration when assessing the utilization of food within Southeast Asia. Firstly, malnourishment of pregnant women is a prominent problem in Southeast Asia. In these cases, the

baby will not get enough nutrients in the womb and will be born with a compromised immune system, poor cognitive development and low weight. "Low birth-weight babies tend to have persistent health problems and their development is impaired" (UNESCAP, n.d., p. 51). After birth, children should be breast-fed for approximately six months in order to ensure they have essential nutrients and a strong immune system to counter disease after birth. In such a case that a child is deprived of essential nutrients in the womb and during the first 6 months of life, it is probable that intergenerational undernourishment will occur, entrenching families in the cycle of poverty (Burgess et al., 2004).

Issues surrounding poor drinking water quality and sanitation practices in Southeast Asia are significant barriers to food utilization, for they can "reduce the quality of food or make it hazardous" (UNESCAP, n.d., p.51). Diseases and infections contracted from poor sanitation practices or poor drinking water quality can inhibit children especially from being able to absorb nutrients due to excessive expulsion through diarrhea or vomit (UNESCAP, n.d). Additionally, the contamination of food can be a result of poor sanitation practices in the region due to processing and transportation techniques. One country with particular contamination problems is Thailand, which means that even if food is available it is not very useful in both the short and long term owing to the fact that it could potentially cause problems related to health (Supaphol, 2010).

Contamination occurs in a variety of different ways. First, it can be a result of being in contact with unhygienic equipment used for production or transport. Second, it can be caused from coming into contact with chemical contaminants such as "heavy metals, hazardous chemicals from soil, water, food containers, pesticides and some prohibited food additives and veterinary medicines" (Supaphol, 2010, p.40). Lastly, "microbiological hazards and pathogenic microorganisms" can be of great concern due to the fact that they can cause serious infections such as salmonella or listeria (Supaphol, 2010, p.40). In order to reduce the risk of food-borne illnesses and contaminants, the government in Thailand has begun to implement "a food safety policy to ensure strict food safety monitoring and control system in the country by focusing on food production and processing throughout the food chain" (Supaphol, 2010, p.40). This process has included a number of government and private stakeholders, all of which have been

given the responsibility to inspect and monitor any contaminants that may have entered the food (Supaphol, 2010, p.41).

Latin America & the Caribbean

One indicator that portrays the relevance, scope, and status of food security in a region is the amount and severity of undernourishment in children. Undernutrition, caused by the insufficient food intake, both quality and quantity, comes as a direct result of lack of access and availability of food (Robles, Torero, 2010). In Latin America & the Caribbean, more then 52 million people - approximately 10% of the region's population - suffer from malnutrition or hunger, which although large, doesn't stand up to the large global undernourishment problem (see Figure 10). The main cause of this high rate of undernutrition is not the lack of food-production capacity, as the region is the biggest exporter of food on the planet, but rather it is a poor distribution of- and access to food (FAO, 2008). This not only portrays the insufficient political policies regarding distribution of food, but also the severity of food security throughout the region, with 10% of the population not having the resources to attain the basic level of nutrition.

Undernutrition as a consequence of food insecurity also has many severe indirect economic impacts. The region's undernutrition in the last few decades has resulted in the loss of 1.7 million individuals - approximately 6% of the working age population (ages 15-64). The greatest economic loses in the region due to deaths attributed to undernutrition take the form of lost human capital, thereby failing the population to reach its productive potential (Martinez, et al., 2009).

Numerous factors contributing to undernutrition become a public health concern in developing regions. As Figure 11 illustrates, there are three main factors that can both increase or

diminish biomedical and productive vulnerabilities which can affect the quantity and quality of nutrients and food ingested (Martinez, et al., 2009). They also affect the availability and accessibility of food for the population to sustain themselves. These three factors can greatly affect production processes, and in doing so can contribute to the autonomy of a country's supply of food, which can cause increasing food insecurity (Martinez, et al., 2009).

One important aspect of food security is the sustainable use of agricultural land, to ensure further productivity for future generations. Latin America & the Caribbean have been unable to narrow the productivity gaps that exist in relation to developed countries. Specifically, in terms of reorganizing its productive system, it still relies heavily on natural-resource-intensive sectors. Due to this lack of advancement towards more sustainable agricultural practices, it will be difficult for Latin America & the Caribbean to establish a growth trend without severe environmental degradation (UNCSD, 2011). Environmental damages and impacts caused by stock-raising activities such as irrigated cropland, livestock, and aquacultures include deforestation, soil degradation, loss of biodiversity, and greenhouse gas emissions. These damages are a result of intensive food production systems, which rely on many technological advancements, such as using high yield fertilizers and pesticides to ease pressure from growing populations and higher demands for food. Intensive production systems are mitigating deforestation and the degradation of pasturelands by relieving some of the pressure on the environment in the short term, by allowing high yields of food of smaller amounts of land. However, the long term sees the potential for unsustainable air and water quality problems due to excess nutrient accumulations in concentrated production systems (UNCSD, 2011).

Another problem that has arisen as a result of unsustainable practices for future food production is the contamination of existing food and watersheds in the environment. However,

the use of intensive food production in Latin America & the Caribbean is an integral part of their economy, and not easily transferable to more sustainable methods. The livestock sector in Latin America & the Caribbean comprises 45% of the regional GDP, which accounts for 13% of global production. The use of intensive food production has allowed the livestock growth rate to double the global livestock growth rate, which is an important part of their economy. Exports account for approximately 42% of global beef exports, and 42% of global poultry exports. Additionally, from 2006 to 2009, Latin America & the Caribbean's share of world agricultural exports reached 14%, up from 11% from 1995 to 1999 (World Bank, n.d.). This shows that while Latin America & the Caribbean rely on an unsustainable high-intensive food production system, it is essential to their economy and to forgo this system would result in widespread food insecurity.

Comparison

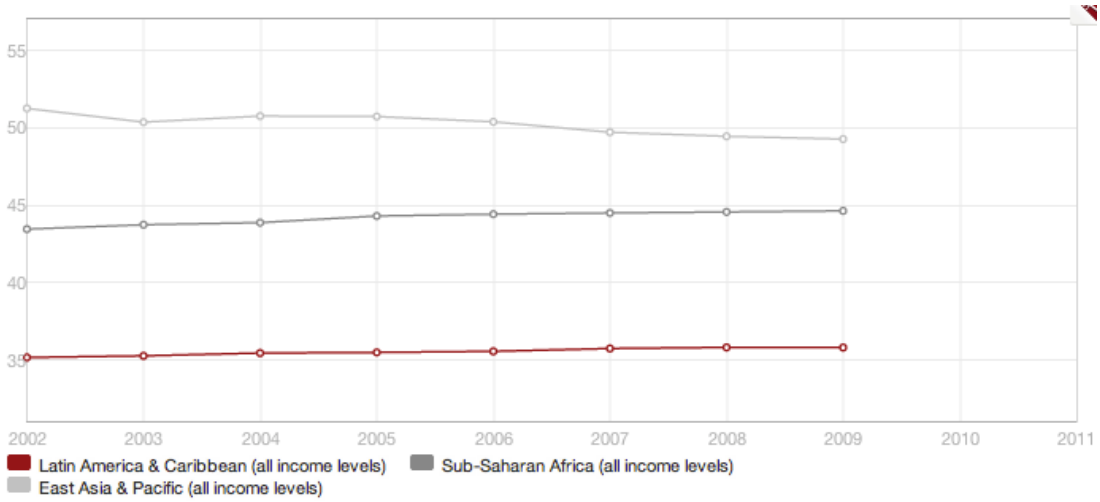
Availability

The capacity for a region to secure adequate food availability for its population is a prominent indicator for the level of food security found in each. Food availability can be defined as the availability of sufficient quantities of appropriate quality, supplied through domestic production or imports (FAO, 2006). The comparison between the three regions, sub-Saharan Africa, Southeast Asia, and Latin America & the Caribbean, illustrates that different food production capacities implicates the level of food security.

The share of agricultural land found in each region can demonstrate the status of food availability in the region, as it depicts the amount of land under permanent crops and pastures. With increased share of agricultural land, there is an increased production capacity for each region to supply food to its population, thus reducing the prevalence of food insecurity and

undernourishment. As the graph below shows, the share of agricultural land within each region has remained relatively static; however, they differ in amount, with sub-Saharan Africa having a higher share of agricultural land in percentage. Paradoxically, although all regions suffer from undernourishment, the situation seems to be more severe in sub-Saharan Africa, inferring that the problem might be linked to food accessibility, instead of availability.

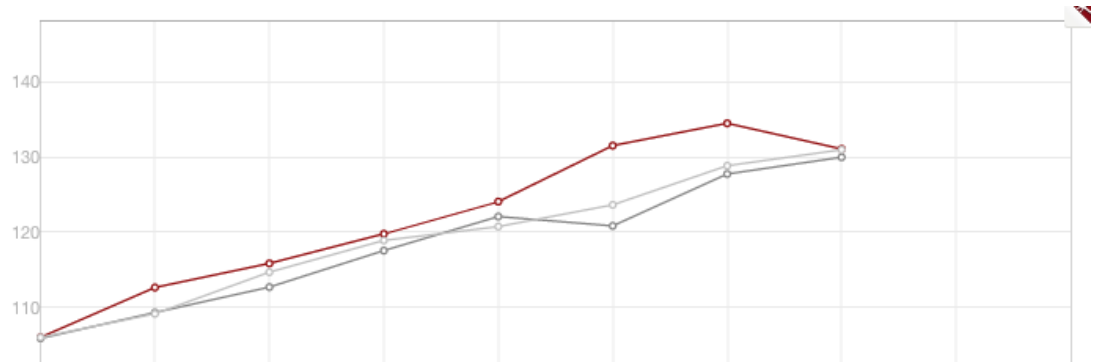
Agricultural Land (% land area)



Source: World Bank, 2012

Food Production Index refers to the amount of food produced, in tones, the region can produce based of its current food production systems. The graph below shows each region's food production, illustrating a general upward trend in the amount of food available from agriculture. Although there has been a general plateau in the percentage of agricultural land share, food production has increased in all regions. Genetically modified crops, and higher use of pesticides and fertilizers may account for the increase in crop production using the same amount of land.

Food Production Index (2000=100)



(World Bank, 2012) use of food production systems may be a consequence of strains on food systems facilitated by an increase in population (as seen in Figure 12). Although all regions face increase in population, in sub-Saharan Africa food insecurity may be more prevalent due to their higher population growth. An increase in production due to high intensive food systems may help attain regional food security in the short-term; however, as a result of these unsustainable practices, future food insecurity will affect all three regions.

Accessibility

As mentioned above, food accessibility is defined by the FAO (2006) as "access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live" (FAO, 2006, p.1). Gender inequality in Southeast Asia, sub-Saharan Africa and Latin America & the Caribbean is an extremely important factor when considering food inaccessibility in developing states. The discrimination of women on both the regional and sub-national scales has resulted in females having poorer access to adequate quantities of good quality food in comparison to males. In order to explore this theory, this paper uses the Gender Inequality Index (GII) to compare gender inequality across the three regions. In sub-Saharan Africa, Ghana has a GII score of 0.729, Mozambique of 0.718 and Rwanda of 0.638. In Southeast Asia, Thailand has a GII score of 0.586, Indonesia of 0.680 and Vietnam of 0.530. Lastly, in

Latin America and the Caribbean Brazil has a GII of 0.631, Haiti of 0.739 and Costa Rica of 0.501 (UNDP, 2010). All regions have relatively poor gender equality, though in sub-Saharan Africa it is most pronounced. However, the reasons for food inaccessibility in each of the regions are different. Countries in sub-Saharan Africa, such as Ethiopia for example, experience significant gender biases within the home due to cultural norms of men having preferential treatment over what food is available (Hadley, 2008). On the other hand, women in Latin America (Leon, 2003) and Southeast Asia have less access to food due to women having poor availability to land, credit services or other market policies that would aid in agricultural production (UNESCAP, n.d.). As a result, women and their families are forced to rely on men for sufficient food sources.

Utilization

When considering regional variations in food security it is necessary to examine differences in food utilization between each region. As previously discussed, the FAO defines food utilization as a state of "nutritional well-being" (2006). The proportion of underweight children and the GDP per capita are two prominent indicators that can be used to make this comparison between sub-Saharan Africa, Southeast Asia and Latin America & the Caribbean.

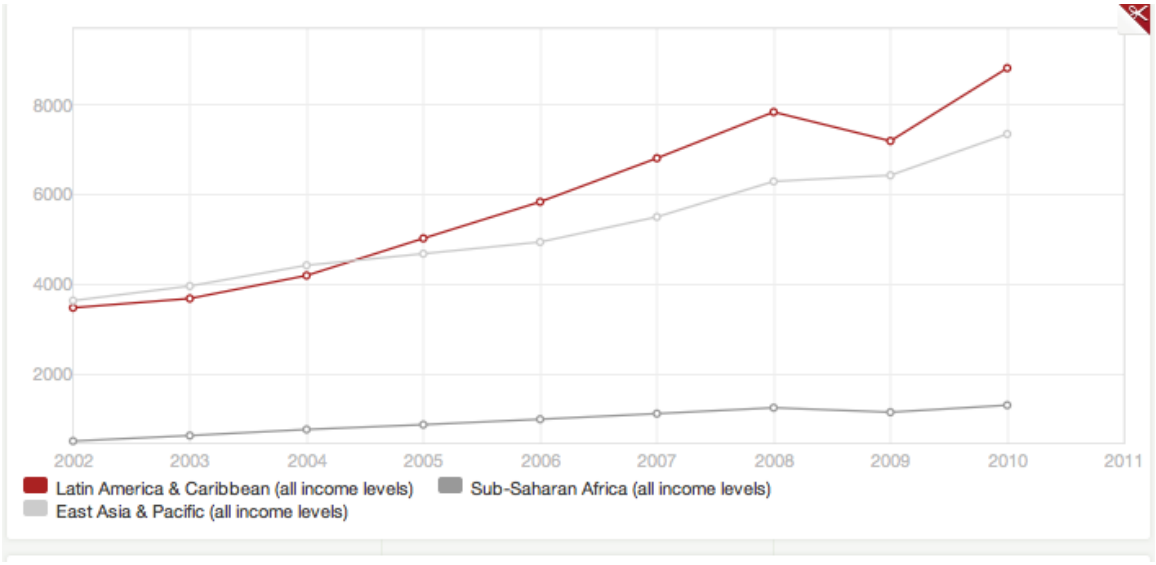
As shown in the following chart, countries in Latin America & the Caribbean have the lowest rates of child under nutrition while comparatively large proportions of the population in sub-Saharan Africa and Southeast Asia are undernourished. Generally, undernourishment is an issue in areas where households do not have adequate access to nutritious food. Unlike Latin America & the Caribbean, where produce is more readily available, sub-Saharan Africa and Southeast Asia consume primarily carbohydrate-based diets. Poorly balanced diets in sub-Saharan Africa and Southeast Asia can be attributed to high cost and low availability of more nutritious food products

	Children Aged < 5 Years Underweight for Age (2004-2007)
SSA	
Congo	28.20%
Ethiopia	34.60%
Ghana	13.90%
SEA	
Indonesia	19.70%
Thailand	7.00%
Vietnam	20.20%
LA & C	
Haiti	18.90%
Mexico	3.40%
Brazil	2.20%

Source: UN Data, n.d.

Furthermore, levels of poverty can help to explain the differing rates of undernourishment between regions. As shown by the following graph, Latin America & the Caribbean have the highest levels of Gross Domestic Product (GDP) per capita and the lowest levels of child undernourishment. Similarly, of the three regions, countries in sub-Saharan Africa suffer from the highest rates of under nutrition as well as have the lowest GDP per capita. It can be inferred that levels of poverty and nutritional attainment are correlated.

GDP per Capita (Current US$)



Conclusion

The results from this study demonstrate that food insecurity is a widespread issue in many developing regions across the globe. Despite regional disparities, underlying similarities persist in sub-Saharan Africa, Southeast Asia and Latin America & the Caribbean. The availability, accessibility and utilization of food are important components of food security, which serve as strong indicators pertaining to health, economic and social development. Recommendations to relieve food insecurity should assess local conditions and be grassroots in nature. The distribution of vitamin supplement pills is a good strategy for short-term relief for under nutrition. Other short-term initiatives to improve food security include micro-credit and the provision of tools and services. In order to improve long-term food security conditions, all three regions require more sound governance and greater institutional capacity and research in agricultural sectors. Additionally, better coping mechanisms and social security would provide farmers with better means of responding to future concerns. Further research should address region-specific initiatives to ameliorate food security concerns.

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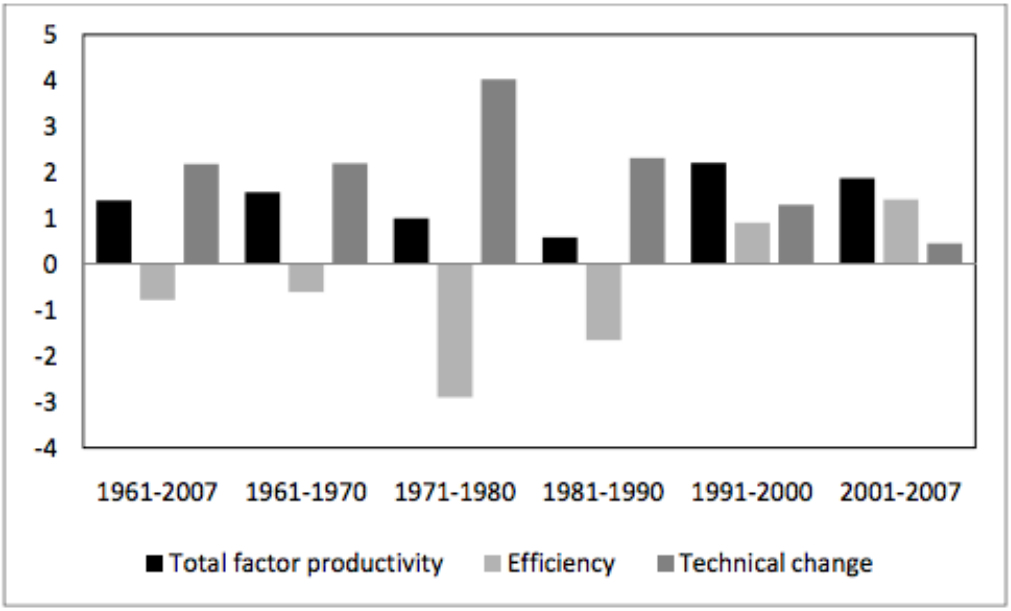
Appendix

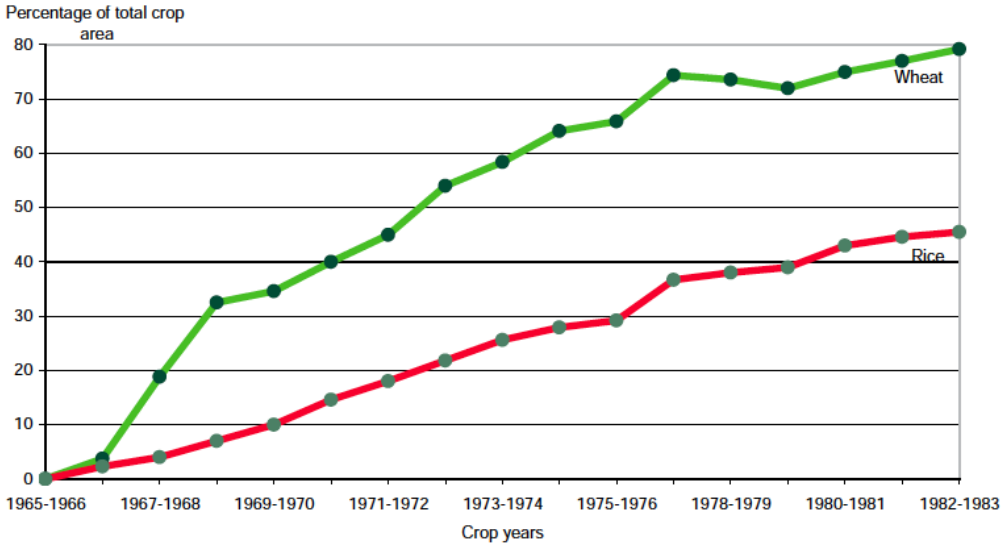
Figure 3: Total Factor Productivity Changes in LA&C



Sources: World Bank (2008). *World Development Indicators 2008* <http://ddp-ext.worldbank.org/ext/DDPQQ/> (accessed in November 2008 for population and income growth). Economic Research Service of the United States Department of Agriculture (ERS-USDA). *International Food Consumption Patterns 2003* <http://www.ers.usda.gov/data/InternationalFoodDemand/> (accessed in November 2008 for income elasticities).

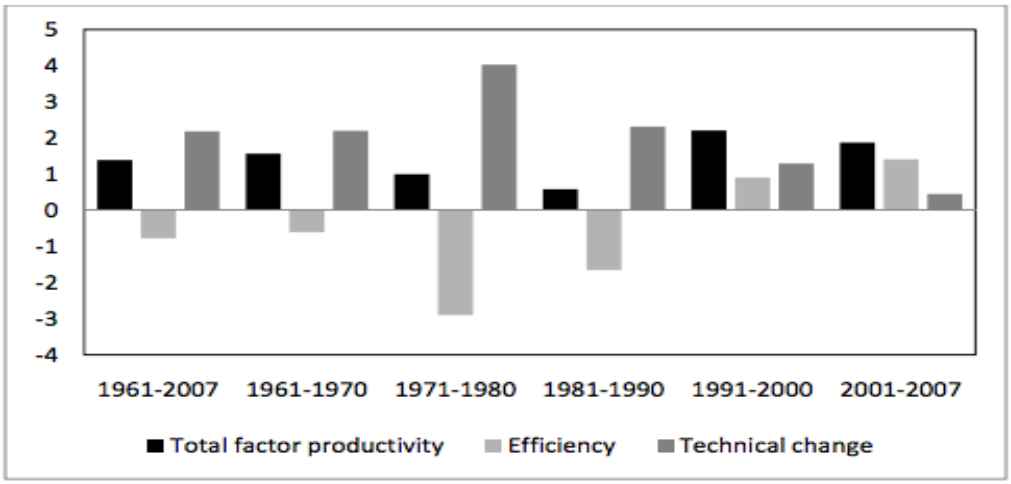
Figure II-1

Figure 2: Increase in HYV Rice and Wheat



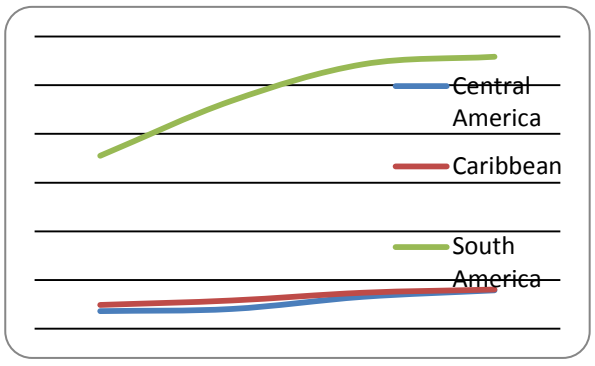
Source: Dalrymple, D (1985). "The Development and Adoption of High-Yielding Varieties of Wheat and Rice in Developing Countries", in *American Journal of Agricultural Economics, 1985,* vol. 67, pp. 1067-1073.

Figure 3: Total Factor Productivity Changes in LA&C



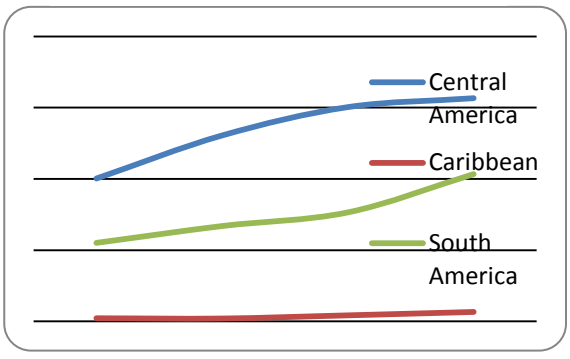
Source: Agricultural Productivity Growth, Efficiency Change, and Technical Progress in Latin America and the Caribbean. Carlos E. Ludena. 2010

Figure 4: Rice Production in Tonnes per year in LA&C



Source: World Bank, 2012

Figure 5: Maize Production in Tonnes per year in LA&C



Source: World Bank, 2012

Figure 6: Projected Trends Resulting from Climate Change in LA&C

Agriculture	Forestry	Fisheries/Aquacultures
Increased yields in certain crops (soybeans, wheat) in temperate zones	Tropical Forests will be harder hit by a decrease of water in the soil	More frequent storms and environmental phenomenon will affect fisheries and aquaculture
1/3 drop in productivity in tropical and subtropical regions due to increase heat and drier soils	Trend towards the 'savannization' of the eastern Amazon. A higher risk of forest loss in Central America and the Amazon.	Reduced water availability resulting from the shrinking of some Andean glaciers could affect some aquaculture production technologies
Increased salinization and desertification of agricultural land in arid zones (central and northern Chile and north-east Brazil)	A longer dry season will make it harder for forests to become re-established.	

Source: Agricultural Productivity Growth, Efficiency Change, and Technical Progress in Latin America and the Caribbean. Carlos E. Ludena. 2010

Figure 7: Rise in Commodity Prices in LA&C

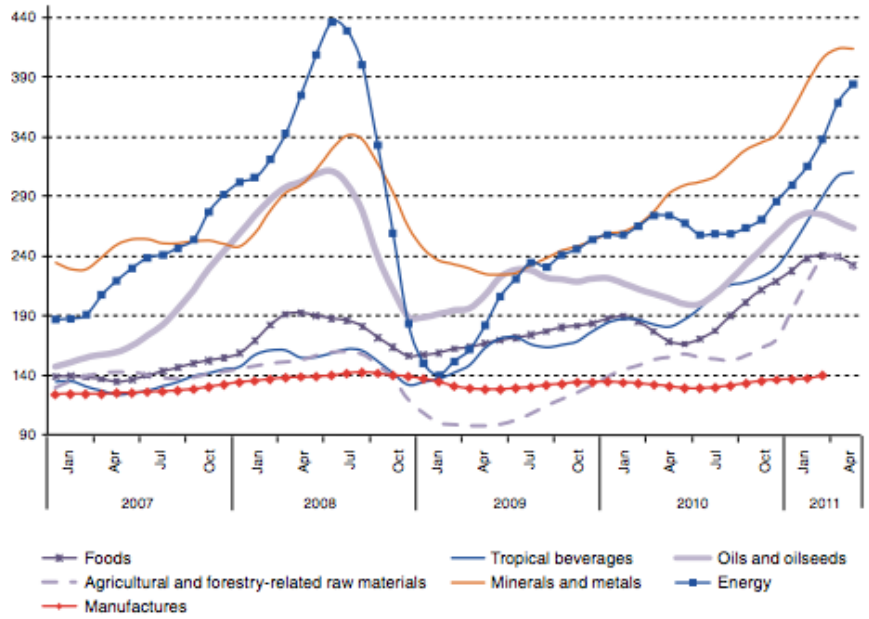


Figure 10: Undernourishment in LA&C Compared to the World

Table 3. *Numbers of Programs and Beneficiaries by Country and Mode of Food Distribution*

Country	Take-home		Direct feeding		Food subsidies	
	Programs	Beneficiaries	Programs	Beneficiaries	Programs	Beneficiaries
Argentina	1	990,521	3	2,219,939	n.a.	n.a.
Bolivia	8	333,006	9	366,016	1	400,000
Brazil	3	16,031,162	1	27,993,257	3	13,682,041
Chile	1	1,354,404	6	567,091	n.a.	n.a.
Colombia	1	29,117	3	2,385,028	2	858,483
Costa Rica	3	58,858	2	403,358	n.a.	n.a.
Dominican Republic	1	89,095	1	88,000	n.a.	n.a.
Ecuador	1	66,045	6	920,899	1	10,000
El Salvador	1	152,218	1	224,804	n.a.	n.a.
Guatemala	3	268,429	1	1,239,520	n.a.	n.a.
Haiti	1	25,576	n.a.	n.a.	n.a.	n.a.
Honduras	2	107,520	2	629,443	n.a.	n.a.
Jamaica	1	4,620	1	80,000	n.a.	n.a.
Mexico	3	610,633	n.a.	n.a.	7	14,245,110
Panama	n.a.	n.a.	1	58,860	n.a.	n.a.
Paraguay	1	21,565	2	100,865	n.a.	n.a.
Peru	3	527,435	4	4,554,895	2	3,264,860
Uruguay	6	638,242	3	263,880	1	18,346
Venezuela	3	168,266	5	2,954,270	n.a.	n.a.
Total	43	21,476,712	51	45,050,125	17	32,478,840

Source: Feeding Latin America's Children. Philip Musgrove. Pg. 31

Figure 9: Rates of Undernourishment in Southeast Asia

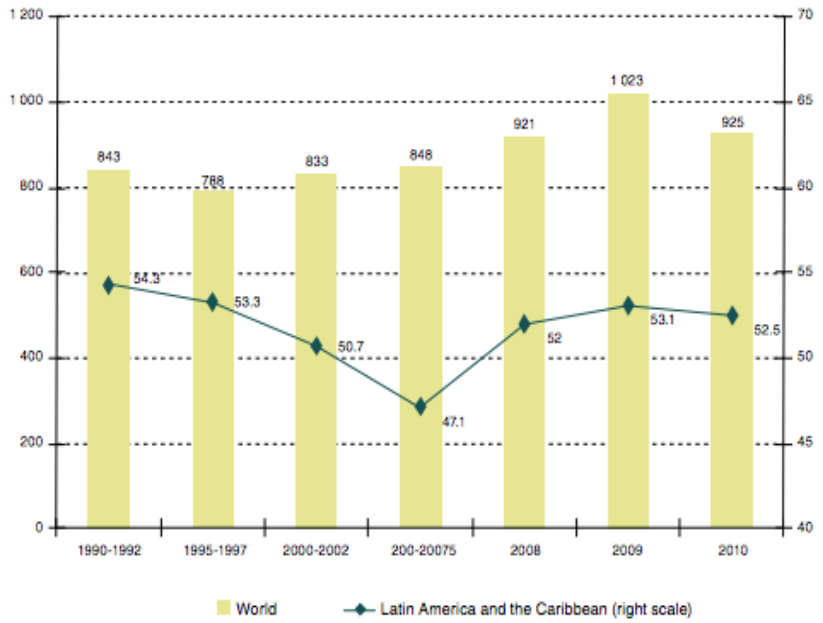
Table I-1 – Population undernourished by country grouping, region and subregion

	Proportion of the population undernourished (average, %)			Number of people undernourished (average, thousands)		
	1990-1992[1]	1995-1997[2]	2003-2005[3]	1990-1992[1]	1995-1997[2]	2003-2005[3]
East & North-East Asia	15	12	10	183,500	152,000	131,800
South-East Asia	24	18	16	105,600	88,600	86,900
South & South-West Asia	25	22	21	282,500	284,800	313,600
North & Central Asia	8	9	11	4,000	4,700	6,500
Pacific	15	14	12	862	909	881
Asia-Pacific total	20	17	16	582,400	535,000	541,900
Developing countries	20	18	16	776,600	774,700	798,500
Sub-Saharan Africa	31	36	32	131,900	192,100	201,400
World	16	14	13	841,900	831,800	848,000

Notes: [1] 1990-1992 average for all countries, except those in Central Asia, where this observation indicates the average for 1993–1995. For the compositions of the subregions, see Table I-2 [2] 1995-1997 average. [3] 2003-2005 average.

Source: FAO (2008). *The State of Food Insecurity in the World 2008: High food prices and food security – threats and opportunities* (Rome, FAO). United Nations (2008). Millennium Development Goals Indicators. The official United Nations site for the MDG Indicators, <http://mdgs.un.org/unsd/mdg/Data.aspx>. For Brunei Darussalam, Maldives and Pacific island States, the population undernourished is calculated from ESCAP (2007). *Statistical Yearbook for Asia and the Pacific 2007* (United Nations publication, Sales No. B.08.II.F1).

Figure 10: Undernourishment in LA&C Compared to the World



Source: Food and Agriculture Organization of the United Nations (FAO), Panorama of Food and Nutrition Security in Latin America, 2010, Santiago, Chile, 2010

Figure 11: Factors that Attribute to Undernutrition

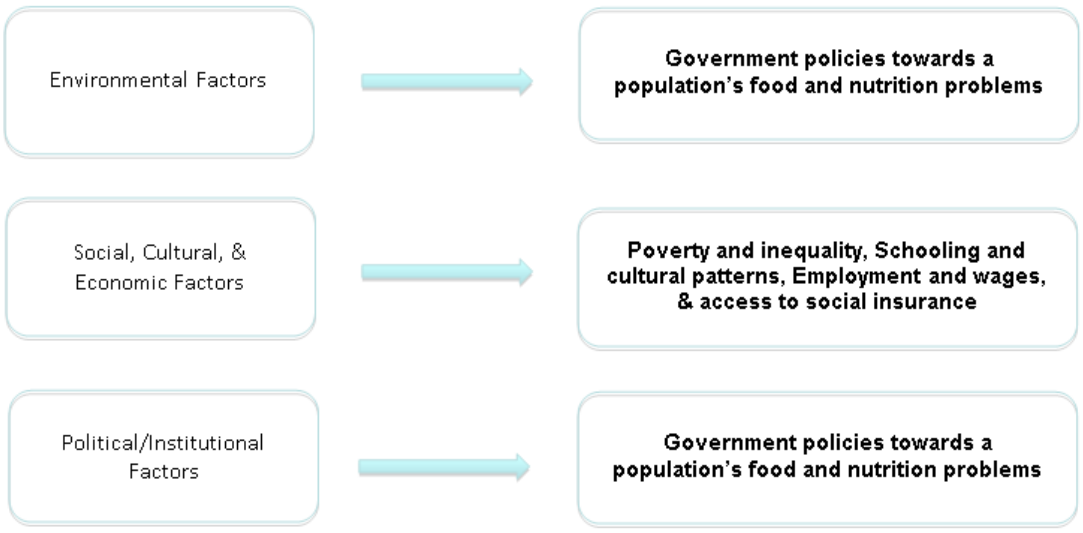
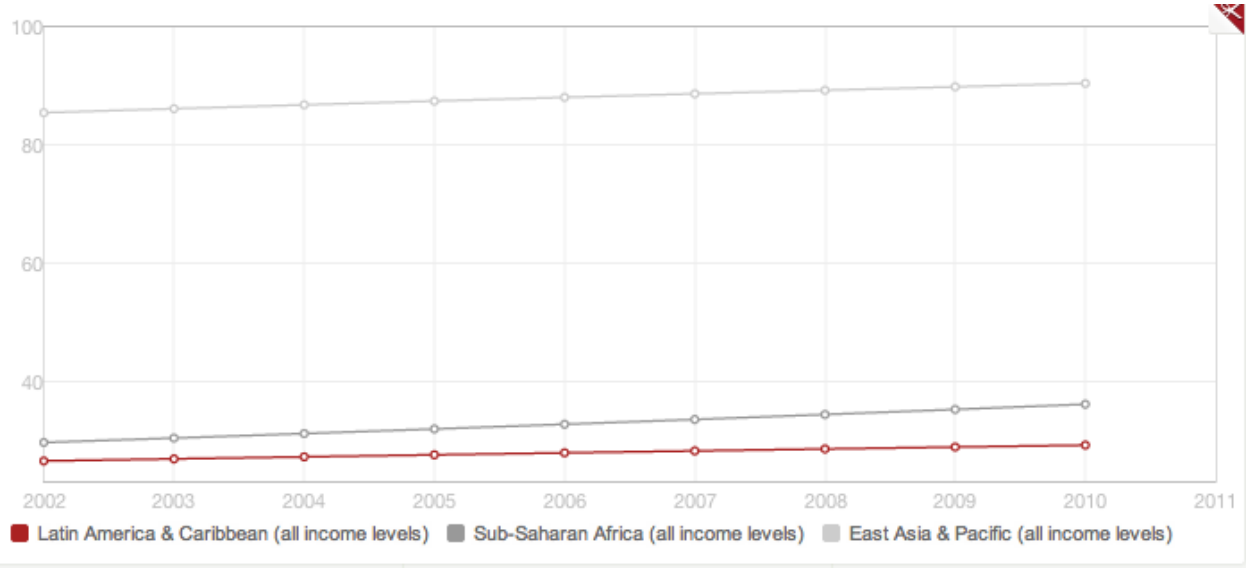


Figure 12: Population Growth in all Three Regions



Source: World Bank Indicators 2012

3 Economic Development as a Means to Poverty Reduction in Uganda: Binding Constraints and Agriculture as a Key Sector for Growth

Conor Murphy, Jason Sparrow, and Michael Tomalty

Introduction

Since President Yoweri Museveni's election in 1986 Uganda has experienced substantial economic growth as well as increased political and social stability. However, while overall average growth rates have been impressive, there remains a plethora of constraints hindering the full capacity of the Ugandan economy. Constraints such as poor infrastructure, a faulty political process, widespread institutional corruption, and an inefficient agricultural sector have all been identified as imperative to the future of Uganda and its economy. International organizations working in conjunction with the Ugandan government have developed a number of important poverty reduction strategy plans in order to foster better economic growth. The most notable of these are the NDP (National Development Plan), the PMA (Plan for Modernization of Agriculture) and the PEAP (Poverty Eradication Plan). These poverty reduction strategy plans have all been created within the context of a nation attempting to move from a peasant to a modern and prosperous country within 30 years. By targeting sectoral growth, employment, socio-economic transformation and improvements in human development indices such as employment, GDP per capita, income level, and gender equality, it is believed that Uganda's competitiveness and goal to graduate to the middle-income segment in the future will be possible. While economic growth has positive effects for all, the focus of the overall economic growth strategy in Uganda largely focuses on its poor. With 86% of the nation living in poor rural areas, it is the consensus belief among economists and government officials that poverty is best addressed through the Agricultural sector. The PMA, created in 2000, aims to improve agricultural productivity and alleviate poverty through modernization and commercialization. Agriculture as a sector faces a number of challenges, with an inefficient financial sector, technological gaps, lack of institutional cohesiveness and poor supply chain communication, it will be essential for the government, private sector and civic organizations to work effectively together in order to implement the proposals of the PMA and other poverty reduction strategy plans.

Constraints to General Development

There are several key constraints to general development of the Ugandan economy, which the Ugandan government, the IMF, and other involved parties (through the NDP) have identified, and that require immediate attention. Though development in Uganda remains a vastly complex subject, it is evident that alleviating these constraints will lead to significant improvement of the working and living conditions of the country, and contribute heavily to poverty reduction. These constraints are also very interconnected, which suggests that the unlocking of a single constraint will have positive effects on others. For example, improvement in the financial sector may lead to greater private sector investment in physical infrastructure, and may reduce the costs of critical inputs such as cement, steel, and fertilizer.

The first constraint is weak public sector management and administration. Problems such as: weak policy, underdeveloped legal and regulatory frameworks, underdeveloped institutional structures and systems, weak civil society and civic participation, inadequate data, and poor information collection, have been used to explain the past inefficiencies of the public sector. In fact, over 70% of government sectors are currently using obsolete, non-existent, or weak policy frameworks (IMF, 2010). For example: inappropriate organizational structures and systems, understaffing, limited strategic oversight, and duplication of roles, have been used to account for the absorption of public funds and the ineffective delivery of public services.

Despite past efforts to limit corruption within the Ugandan public sector, the problem is far from solved. Corruption negatively affects public service delivery in many areas, particularly in the administration of public expenditure and the management of government revenue. As it stands, the citizenry does not yet hold the power to engage in negotiations or demands for better public services. Economic development will be a key condition for the social and political empowerment of the Ugandan people. Uganda also compares poorly on an international scale in terms of corruption: it has been ranked 130 out of 180 countries on Transparency International's Corruption Perception Indices for 2008/09 (IMF, 2010). In 2009, Uganda scored 2.5 out of 6 on the World Bank's CPIA transparency, accountability, and corruption in the public sector rating (1=low to 6=high) (World Bank Indicators, 2009).

The second major constraint to development is inadequate access to financial services. The lack of availability of funds within the private sector makes it difficult for individuals to start businesses, invest in education, acquire farming equipment, et cetera. The private banking system does not penetrate very deeply into the population. Only 16% of Ugandans have bank accounts, of which the majority resides in urban areas (IMF, 2010). The capital and money markets are severely underdeveloped: few financial instruments are available, and the framework for the issuance of bonds is inadequate. Additionally, the nominal interest rates (for borrowing) are very high: between 17% and 23% per annum (IMF, 2010). This discourages investment and makes borrowing particularly burdensome. The interest rates in the microfinance sector are even higher, ranging from 24% to 36%. As a result, few people make use of microfinance institutions: 8 per 1000 adults (World Bank Indicators, 2010). The low savings culture of the country and the lack of proper financing makes raising domestic capital for investment expensive and risky. It will be important in the future for the government and financial institutions to target lower interest rates in order to promote savings for individuals, especially in rural areas.

The third major constraint is the inadequate quantity and quality of human resources. Uganda possesses a very fast-growing, and young labour force. Proper training and education for these people has been identified as crucial for the organizational success of the nation. Despite government efforts to provide training at various levels, large deficits of skilled human labour and capital currently exist. This is demonstrated by: wide wage differentials, and a large number of empty posts in technical areas. The quality of primary and secondary education is also an issue; low completion rates are typical for these institutions.

The current vocational and technical training institutions in Uganda have very limited capacity. With few people getting into these higher education programs, it will be difficult for technology-dependent sectors of the economy to move foreword (for example: telecommunications). 'Brain drain' (a phenomenon where the smarter and more educated people in a country tend to leave) is very common in Uganda, as there is often inadequate incentive for the educated to remain in the country. The health sector also suffers from a lack of human capital. In 2010, the ratio of doctors to patients was 1: 24, 725, and the ratio of nurses to patients was 1: 1634 (IMF, 2010).

The fourth major constraint is inadequate physical infrastructure. The movement of final goods and services in Uganda is both logistically difficult, and expensive. This in turn constrains

production within many sectors of the economy. The most common method of moving cargo freight is by road, which accounts for 96.4% of the total. However, only 4% of the roads in Uganda are actually paved (IMF, 2010). The rail system (which is about 3 times cheaper than road for shipping) accounts for just 3.5% of the total cargo freight and only 26% of the existing railway is currently operational. It will be very important in the future for the government to improve this railroad system in order to foster trade and growth. Moreover, a high export tax, between 25% and 50%, accounts for another significant barrier to shipping goods out of the country (IMF, 2010).

There is very limited electrical infrastructure in Uganda. A poor distribution system is used, and the country has very weak generation capacity. As a result, only 11% of the population has access to electricity (IMF, 2010).

Uganda's communication infrastructure has improved significantly in recent decades since the liberalization of the sector, and the hefty private investment that followed. However, the medium is still constrained by the high costs of access/usage, limited coverage, and limited diversity of mediums (IMF, 2010).

The consumptive use of water in Uganda is much lower than the world average. In Uganda, the average person will consume 21 cubic meters of water per year. This is compared with 599 cubic meters per year for the average person on earth. Lack of water is very problematic in agriculture, as irrigation, and thereby crop yield are negatively affected. Many industrial processes are also limited because of the limited water supply. In terms of personal usage, 63% of the rural population and 72% of the urban population has access to safe water for domestic needs. This means that approximately 30% of the population has no access to a safe water source (IMF, 2010).

The fifth major constraint to development is gender issues, negative attitudes, mind-set, cultural practices and perceptions. Currently, women are often left out of important political, social, and economic decisions within the household and wider society. Furthermore, as a result of cultural mindset over time, many women's rights are not protected under the law.

The sixth major constraint to development is the low application of services, technology, and innovation. Uganda is known for poor quality products and service delivery. The percentage

of manufactured to primary goods for export was 4.2% of the total in 2008/09 (IMF, 2010). Encouraging high value exports is high on the government's list of priorities.

A lack of research and development has also held back the Ugandan economy. Approximately 1 in 1000 Ugandans are research and development personnel; this is compared with about 5-18 per 1000 in OECD countries. Additionally, on average only 3 patents per year are issued in Uganda. This is partly due to an underdeveloped legal system, and partly due to underinvestment. In 2005/06, 0.3% of Uganda's GDP was designated towards research and development. The Ugandan government and the IMF have identified that funding for this crucial area must increase in the future (IMF, 2010).

The final key constraint to development is the inadequate supply and limited access to critical inputs. These inputs include raw materials such as: fertilizers, water, human and financial resources, and physical capital. Fertilizer use in Uganda has recently increased from 0.37Kg per hectare in 2000 to 1 Kg per hectare. However this is quite small compared with neighboring countries: in Tanzania 6 Kg per hectare is used, 16kg per hectare in Malawi, and 31.3Kg per hectare in Kenya. This is largely due to the high and volatile cost of fertilizer in Uganda. In January 2007 fertilizer was 252$ (USD) per metric ton, whereas in January 2008 it cost 752$ per ton (IMF, 2010).

Lack of irrigation is a further constraint on agricultural output. In Uganda, 14, 418 hectares are currently irrigated. However, 400, 000 hectares in the country have the potential for irrigation, this translates into 3.6% exploitation. Securing further sources of water is critical for Uganda's agricultural industry. Substantially increased irrigation is also a direct way to alleviate the poverty of the numerous subsistence farmers in Uganda (IMF, 2010).

The lack of physical infrastructure can be partially attributed to the lack of critical inputs. The price of cement in Uganda is 15$/Kg (USD), compared to 3$ in Malaysia, and 10$ in Kenya. Additionally, Uganda's steel production only meets 9% of the countries demand for steel. Uganda has 4 steel mills, which produce an average of 7000 metric tons of steel per year, using scrap metal as their primary input. The national demand for steel is on average, 60,000 to 80,000 metric tons per year. By comparison, Kenya produced 220, 000 tons in 2003 (IMF, 2010).

With the above constraints in mind, the Ugandan government, working in conjunction with the International Monetary Fund, through the National Development Plan (NDP), has outlined several strategic goals and interventions for the future. The vision of the NDP is "A transformed Ugandan society from a peasant to a modern and prosperous country within 30 years." The report identifies 8 strategic goals for the country: 1). Increased household income and equity (specifically gender equity). 2). Improved availability and quality of employment. 3). Improved amount and quality of economic infrastructure. 4). Increased access to quality social services. 5). More science, technology, and innovation promoted to enhance domestic and international competition. 6). Improved education, training and other human capital development. 7). Strengthening the country's defense and security, while providing good governance. 8). Promoting a sustainable population, and sustainable usage of the environment and natural resources (IMF, 2010).

In terms of pursuing the above goals, a quasi-market approach is recommended. By this methodology, the private sector is expected to remain the primary instrument of development and growth. The government is to play a facilitating role through the implementation of a conductive policy. In other words, the government is expected to provide smooth regulatory and institutional frameworks for the private sector to operate within. Other roles of the government include: pursuing productive private-public relationships, encouraging foreign investment through outward-directed policies, encouraging high-value exports, as well as sound macroeconomic policy and management (e.g. monetary and fiscal policy). It is further recommended that a 'business approach' mentality be adopted for the country: both the public and private sectors should view Uganda as a business in which they share ownership, and therefore stewardship (IMF, 2010).

Many of the Uganda's binding constraints to development can be unlocked by improving the country's financial sector. The government has identified such goals as: a low inflation rate, a competitive exchange rate, and continued strict regulation of the financial sector. Additionally, it has been proposed that increasing innovation and product development as to put more financial instruments on the market, will greatly improve Uganda's underdeveloped money markets. The capital markets are also in need of innovation, as well as a better framework for the issuance of bonds (e.g. infrastructure bonds). The liberalization of pension plans, and related retirement

benefits, will likely increase Uganda's investor base. This will also encourage retail investment, and promote collective investment schemes such as mutual funds. The bottom line is that development Uganda requires a significant increase in total investment.

Another goal of the financial sector is to increase intermediation in a manner that will reduce the interest rate spread (reflecting a generally lower risk for investors). The microfinance sector is also in need of improvement as it is of direct relevance to poverty alleviation in both rural and urban areas. The government's goal in this regard is to support existing establishments by strengthening, expanding, and consolidating microfinance institutions.

Agriculture as a Strategic Sector

Agriculture plays a very unique and important role in the Ugandan economy. While it represents approximately 23.5% of GDP, it employs nearly 73% of the population (UBOS, 2005). Not only does it provide significant labour opportunities, but also, it is a major contributor in the broader macro economy. Agriculture represents 47% of total exports, which has made it instrumental in helping improve Uganda's balance of payments as well as maintaining the value of the Ugandan shilling. Agriculture also plays a vital role in the Ugandan economy as a feeder sector; its prosperity helps maintain growth in the manufacturing and services sector (UBOS, 2008).

Because of agriculture's strategic importance to the broader Ugandan economy, and the significant majority of individuals living within rural agricultural areas (86% of the population), continued growth and increased investment in the sector is imperative to future poverty reduction initiatives. If the current growth rate of 2.8% for the sector is maintained, it is predicted that by 2015, the poverty rate will be reduced to 26.5% by the year 2015 (Benin et al, 2007). Alternatively, if there is increased financial and infrastructural investment in the sector, it is believed that growth could reach an average of 5.9% and reduce poverty by an additional 8.6%, which would reduce the overall number of individuals living in poverty to approximately 6.9% (Benin et al, 2007).

While a vast majority of rural Ugandans live off of subsistence farming, there still remain significant issues in regards to food security. The country's average caloric intake per person per day improved from 1,494 in 1992 to 2,193 in 1999 but declined to 2,066 in 2002 and to 1,971 in 2005. Although the decline is marginal, the average intake is still less than the World Health

Organization (WHO) recommended daily intake of 2,300 per adult per day (UBOS 2008). Governments and civic organizations have been promoting the growth of local markets and co-operative farming operations instead of the subsistence model which often leaves individual farmers and their families heavily exposed to weather and other uncontrollable economic conditions.

Analysis of Ugandan crop production statistics has revealed a mixed picture in terms of overall agricultural growth. While some crop sub sectors have expanded and increased yields, many have decreased in terms of production capacity. Successful crops cite land saving technologies such as seeds, fertilizers and better agronomic practices as their reasons for success. Those with poorer growth or declining output have identified weather changes, crop pests, poor soil management, disease epidemics and global commodity price changes as reasons for failure. Although agriculture will remain somewhat exposed to various unavoidable natural variables, it is apparent that increased investment in land saving technologies and cooperative land usage can help hedge against future risks (MAAIF, 2008).

Livestock inventories have significantly grown over the last decade. This can be attributed largely to the privatization of the Dairy Corporation in 2006. While not a significant market yet, with proper utilization of new technologies and necessary inputs, there is potential for a large export market in dairy and meat (MAAIF, 2008).

The PMA

The Plan for Modernization of Agriculture (PMA), introduced in 2000, aims to significantly reduce poverty through agricultural modernization and commercialization. The creators of the plan, mostly economists and government officials, believe that poverty reduction in Uganda will be most effectively addressed by focusing on the transformation of subsistence farming to a commercial and market based agricultural sector (MAAIF & MFPED, 2000).

The 4 main objectives of the PMA are: (i) increase incomes and improve the quality of life of poor subsistence farmers through increased agricultural productivity and increased share of marketed production. (ii) Improve household food security through the market rather than emphasizing self-sufficiency. (iii) Provide gainful employment through the secondary benefits of PMA implementation such as agro-processing factories and services. (iv) Promote sustainable

use and management of natural resources by developing a land use and management policy and promotion of environmentally friendly technology (MAAIF & MFPED, 2000). In order to achieve these objectives, a number of intervention areas were identified, most notably, research and technology development, agricultural advisory services, rural finance, agro-processing and marketing, agricultural education, supportive infrastructure, and sustainable natural resource use and management (MAAIF & MFPED, 2000).

Agriculture: Potential Growth Constraints

Despite significant concentrated and mandated efforts to promote expansion and productivity growth in the agricultural sector, there remain many significant barriers to growth. While the PMA provides a solid framework for strategy implementation, communication between the government and institutions responsible for the delivery or resources and services has been poor. This has lead to inefficient policy implementation and inadequate improvement of crucial aspects of the mandated poverty reduction strategy as outlined in the PMA.

Access to capital has been a major issue in recent years. Due to the high administrative costs of agricultural loans and extremely high interest rates, farmers are unable or uninterested in applying for financial assistance. This has lead to inadequate levels of capital investment, which is essential to the commercialization and modernization of the sector (MFPED, 2001).

Lack of human resource capacity is also a major concern. With technical staff in high demand, low education rates, as well as brain drain have combined to create a damaging shortage of technically skilled workers. These workers are needed in key agricultural areas such as research, disease control, extension services and soil science. Disease out breaks in recent years have contributed to depleted crop stocks in many parts of the nation and killed millions of valuable livestock. While education and human capital levels will increase with decreased poverty, education and resource accumulation must be aggressively pursued in Uganda immediately as a means to bolster current and medium term growth (MAAIF, 2008).

As the population grows, land tenure disputes and decreased access to farmland have become increasingly detrimental to agricultural growth. Cultural and traditional norms have left peasant farmers accustomed to inefficient farming practices, while overlapping lands and refusal to farm cooperatively have significantly hurt current and future hopes for commercialization and

modernization in the sector. One of the PMA's most imperative and immediately necessary objectives is to promote food securitization through market exchange rather than subsistence farming. This goal can only be accomplished by increasing cooperation between local farmers, and productivity increases created by greater input investment and economies of scale (MAAIF & MFPED, 2000).

While there are major problems in terms of production efficiency and capacity, there are also issues with the marketing and transportation of agricultural products once brought to market. Food safety and quality assurance are often neglected which has hurt Agricultural products in regional and international export markets. Also, production, processing and marketing are poorly coordinated. Poor infrastructure and market information leads to most produce being sold in raw form and processed on a smaller scale. This is highly inefficient and is partially responsible for high and volatile food prices seen across Uganda (Benin et al, 2007).

Future Strategies

In order to properly address the constraints to Agricultural growth, the Ugandan government must work effectively with the private sector to implement effective strategies. Enhancing agricultural production and productivity will require significant investment in R&D, improved technological inputs, better access for farmers to advisory services and an increased role in technological development, among others. Issues such as disease and pest concerns remain a significant issue for farms of all sizes in Uganda. In order to address this there must be visible improvements in early detection of crop pests, weeds and diseases. Local governments must improve their ability to deal with all types of disease and pest controls, and definite policies and regulations must be created in order to keep track of possible outbreaks.

Water supply for agricultural productions is inadequate and must be improved as well. By rehabilitating government irrigation systems, establishing a water supply monitoring framework and building capacity in the irrigation subsector, water capacity can be significantly improved and could contribute extensively to improved agricultural productivity (MAAIF & MFPED (2000).

Labor saving technologies and mechanisms will also be imperative in increasing agricultural productivity and promoting poverty reduction. While economies of scale,

improvements in agro-processing, and increased mechanization of the agricultural process will help reduce costs and improve efficiency, these labor saving technologies have much broader economic implications. Decreased time spent on labor, would enable individuals to spend more time on education and human capital building (Benin et al 2007). This in turn would pay dividends to other sectors of the economy and boost overall growth in Uganda.

Inefficiency has plagued the sustainability of Agricultural markets in Uganda. In order to address this there must be major improvements in value chain linkages. Farmers must have better and quicker access to market information, agro-processing and value added products must be promoted as a means to higher incomes and tax regimes must incentivize farming, marketing, and production (Benin et al, 2007). Ensuring that all aspects of agricultural farming, production and marketing operate in an informed and cohesive manner is essential to modernization and commercialization of the agricultural sector.

Finally, creating a competitive business and investment environment will be essential for Agricultural success. By improving quality assurance, moving towards national regulation, international food safety standards and creating more homogeneous final products, Ugandan goods will become more competitive domestically and internationally.

Agriculture is and will remain a key strategic sector in order to improve employment, reduce poverty, bolster other sectors of the economy and provide consistent export income, however, longer-term strategies would have large-scale movement of subsistence farmers into other sectors of the economy. Increases in Agricultural productivity and income should be seen as a medium term strategy to enable subsistence farmers to have more time to engage in human capital building and income diversification as a means to modernizing the economy as a whole.

Monitoring and Evaluation

Monitoring and evaluation the progress of poverty eradication strategies for Uganda will be deeply tied with their success. Strong political will, and commitment to transparency is crucial to the limitation of public-sector corruption. A central goal of results oriented initiatives, such as the poverty eradication strategies, is to promote the most promising sectors of a country while eliminating inefficiencies. Such a system relies on reliable feedback from all sectors of the country in order to be effective. Currently the feedback and information mechanisms in Uganda

are weak, making it difficult to locate any system breakdowns. Therefore, any improvement is unlikely under the current system. A new Ugandan monitoring system would facilitate transparency as well as accountability to make identifying sources of breakdowns as specific as possible (IMF, 2010).

To achieve an outcome worthy of capturing public imagination, the Ugandan government must develop a currently lacking monitoring and evaluation system to strengthen management of government activities within ministries and local government. To help aid the system, the Ugandan government needs to acknowledge accountability within civil society and parliament. The glaring problem is that both information management and decision making is centered on the administrative aspects instead of on the outcomes and impacts of goals. Further deficits of the system include short sighted focus of planning, budget, and incentives on immediate outputs as opposed to longer term, and often more important outcomes. Improved efficiency would see that recurrent and development expenditures are reviewed. A more efficient system would focus on policies, programs, and project efforts. The current monitoring apparatus needs to be diverted from entrenched government bureaucracy to more outcome-based strategies. Furthermore, public servants who are burdened with large volumes of paperwork, tend to lack systematic monitoring systems for evaluating the effectiveness of public service delivery. Another improvement is possible in the form of comprehensive goals and government wide accountability instead of the current narrow focus on specific departmental responsibilities. Decentralization continues to be a concern as there is also a lack of institutional and human resources. Responsibilities are gradually being decentralized to districts and front line services; however, the bulk of resources and expenditures still remain with the central government. Further efforts would see alignment of the Medium Term Expenditure Framework (MTEF) budget format, which would help public service conditions as well the decentralization efforts. Other obstacles include inspections and audits where there is public capital involved; however, there is insufficient coordination, reporting and follow ups. Under the current framework used to apply the poverty action fund, conditional grants are under strong control. This disables local governments from deciding specifically what is best for them. Finally, ministerial information systems cannot currently provide frontline delivery records that are vital to the success of the monitoring and evaluation objectives (IDA & IMF, 2010).

The current Ugandan monitoring and evaluation system evolved from the Poverty Eradication Action Plan (initiated in 1997). A goal of the PEAP is for sector and management efforts to be guided by precise medium-term goals and targets. Continuous monitoring of service delivery will need to be used to establish base-line goals, to target and inform work planning, and improve budgeting and managerial performance (IDA & IMF, 2010).

Harmonization of reporting needs to be expanded to include a uniform format for project progress reports, and should include harmonization of reports pertaining to broader sector and poverty programs. Finalization of the poverty monitoring strategy will include a draft of national poverty monitoring strategy to close gaps in the existing system (IMF, 2010).

The results oriented management of these poverty reduction strategies will produce output based budgeting systems that will rely heavily on accountability. Performance contracts for permanent secretaries and accounting offices will also increase efficiency. Further, adoption of budget framework papers and ministerial policy statements will mandate sectors to clearly state objectives, targets, outputs and outcomes. Uganda will also try to establish an early warning system for potentially problematic areas to improve efficiency. Further, the National Planning Forum will regularly assess the various poverty reduction strategies performance, making important interventions when necessary. This forum will be chaired by the Ugandan president and will be assisted by ministries, private sector level management, development partners, as well as local and community level governments (IMF, 2010).

More specific responsibilities lead to higher accountability and efficiency. Resource mobilization at the ground level will be overseen by the Ministry of Finance, Planning, and Economic Development. They will also be responsible for the formation of national budgets which are crucial to controlling the monetary markets. The Ministry of Public Service will delegate the provision of human labor to certain sectors and intervene when sectors are not absorbing proper amounts of labor. Further, local governments will be responsible for monitoring the frontline service delivery and accountability for the results. All sectors will report quarterly to Office of the Prime Minister on key expenditures, actions, outputs, and progress towards outcomes. Local government will report quarterly to the Ministry of Financial Planning and Economic Development, which will result in six month budget performance reports. These reports will be shared in the National Government performance reports, which come out every

six months and will be quality assured by the TICC[1] and the cabinet. The performance-based reports include: Annual national development report, annual strategic development report, annual fixed performance, and annual state of affairs. These reports will be reviewed by the NPA[2], Office of the Prime Minister, MOFDEP [3], and the Bank of Uganda[4] respectively. An important mid-term review will provide an in-depth view of progress and will be a pivotal point in the general process. This review will be conducted two and half years into the implementation being led by the National Planning Authority and will measure intended objectives against key outputs. The final evaluation of the NDP will assess overall performance and provide insight into how the next NDP initiative should be conducted. This will take place four and half years in, and will be provided by the Office of the Prime Minister (IMF, 2010).

Conclusion

Development and poverty in Uganda are multifaceted social and economic problems; they are currently being combated in a variety of ways operating within the context of the poverty reduction strategy papers. The focus of these medium term strategies is mostly focused on infrastructural development, improved institutional cohesiveness, financial sector reform and agricultural investment. By addressing these binding constraints Uganda has and will continue to improve the fundamentals of its economy and in doing so reduce poverty and increase the incomes of its citizens. It will be particularly important to effectively monitor the implementation of these poverty reduction strategies in order to gain new insights and ensure that the future course of action is based on tangible results. While achieving middle-income status will be difficult for Uganda, current initiatives have provided a solid foundation for short and medium term growth.

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[1] Technical Implementation Coordination Committee
[2] National Planning Authority
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4 Post War Redevelopment of Sierra Leone

Brianne Knox, Nathan Stewart, and Jake Ilnicki

Introduction

Sierra Leone presents a particularly interesting case study of development due to the recent civil war and the vast natural resources contained within the nation. Although it has been ten years since the violence has ended, Sierra Leone is experiencing ongoing issues that impede development and redevelopment. These issues are compounded by demographic complexities that include ethno-regionalism, population instability due to refugees from other nations and those returning from exile, and the substantial number of unemployed and disenfranchised youths. Economic instability is magnified through the extensive reliance on the informal economy, stripping the government of the potential for funding through taxation and limiting the ability to supply needed infrastructure. Sierra Leone relies heavily on natural resources for economic production on a global scale, while this can temporarily increase economic benefit the outcome is short lived, can be environmentally damaging, is often controlled by foreign entities, and can lead to conflict as seen in the civil war. While there was an influx of foreign aid immediately after the cessation of violence this funding has become more limited throughout the years. Although the government provides some modest social services they are insufficient and the focus remains with a detrimental emphasis and reliance on foreign aid programs. Statistical data from reports like the Human Development Index illustrate that minimal progress is currently being obtained. In order to maintain and continue this progress Sierra Leone's government must encourage economic development and formalization of the economy. Through these means it would be possible to accumulate the wealth needed for development and thus continue the cycle of poverty escape.

History of Civil War of Sierra Leone

The civil war in Sierra Leone started on March 23, 1991 when the Revolutionary United Front (RUF), with support from the special forces of Charles Taylor's National Patriotic Front of Liberia (NPFL) entered Sierra Leone in attempt to overthrow the Joseph Momoh government and take the diamond fields for themselves. This civil war would last eleven years and would envelope the country while killing more than 50,000 people.

In the first year of the war the RUF took control of the east and south parts of Sierra Leone which was the richest part of the country for harvesting diamonds. The lack of government interest to respond to the threat of the RUF lead to a coup d'état in 1992 by the National Provisional Ruling Council. By the end of 1993 Sierra Leone's army succeeded in pushing the RUF and the NPFL rebels back to the Liberian borders. Shortly after this the RUF recovered from the onslaught and the fighting continued.

In 1996 Sierra Leone installed an elected civilian government. This government forced the RUF to sign the Abidjan Peace Accord and under UN pressure this government terminated its contract with a South African private military group before the accord could be finished. The RUG saw this and resumed hostiles since they did not have to fight the private military group.

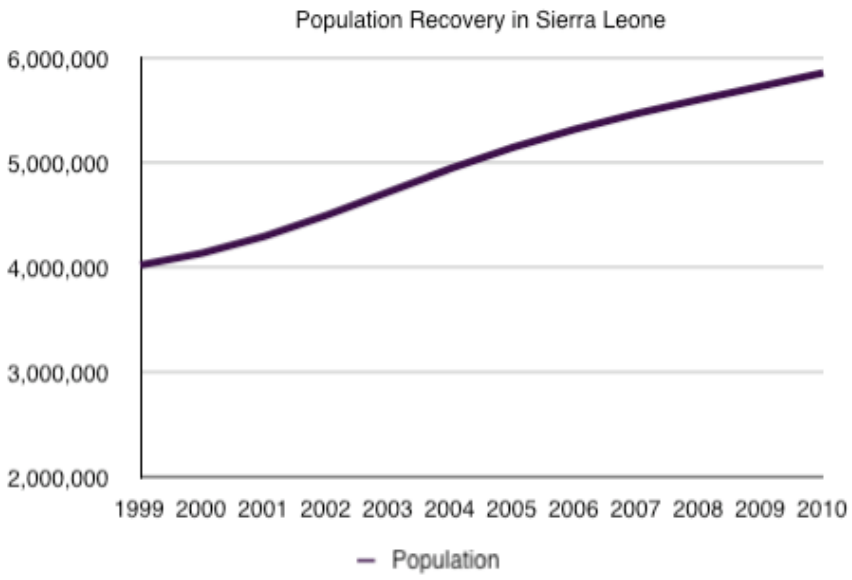
In 1997 some disgruntled members of the Sierra Leone army staged a coup d'état and established the Armed Forces Revolutionary Council (AFRC). The RUF joined the AFRC to capture Freetown the capital of Sierra Leone and put leader Johnny Paul Koroma in charge of the country. Koroma declared the war over and this was followed by looting, rape, and murder which lead to many people fleeing the country.

In 1999 the Lome Peace Accord was signed giving Foday Sunkuh, commander of the RUF, the vice presidency and the control of Sierra Leone's diamond mines. In return the RUF would stop the fighting and the deployment of UN peacekeeping force would head into the country to support this accord. The only problem was that the RUF compliance was sluggish again and in May, two thousand rebels advanced on Freetown. The British intervened to stop the force approaching Freetown. They also went to Sierra Leone to save the failing UN mission and the weak government of President Ahmand Tejan Kabbah.

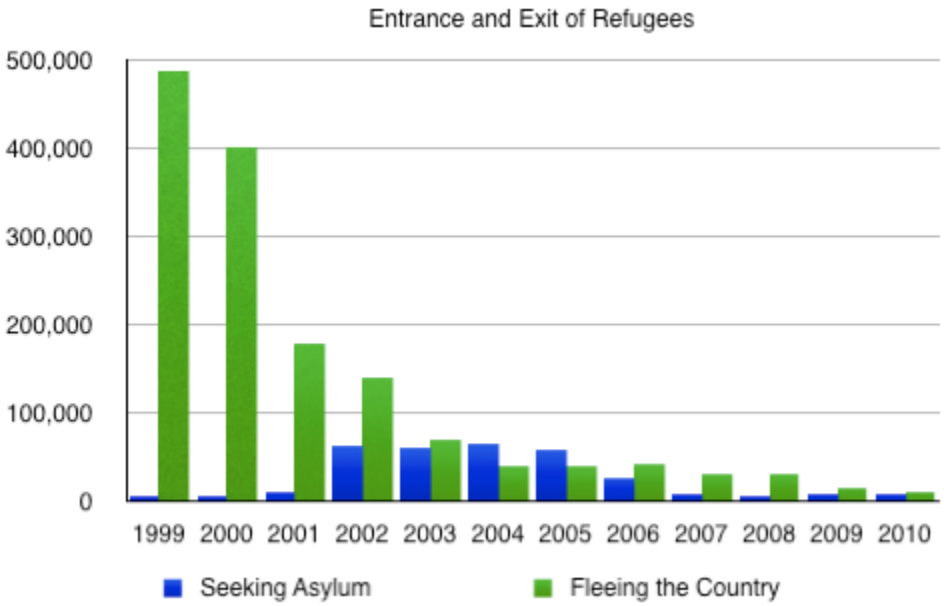
The war finally ended when the help from the UN mandate and the Guinean Air Force joined with the British forces in the British operation Palliser. This operation would finally put a stop to the RUF and in 2002 President Kabbah declared the Sierra Leone civil war over.

Demographic Overview

Sierra Leone continues to experience issues related to population fluctuations and the refugee situation stemming from the civil war. The country currently has a population of 5 485 998 and as illustrated by graph, post civil war population recovery is currently taking place.



This is due to both cessation of violence and the return of former refugees. Throughout the civil war large numbers of people fled the country to seek exile in neighbouring countries Guinea and Liberia, or elsewhere.



For three straight years between 1998 and 2000, each year over 400000 refugees were exiled from Sierra Leone. More recently, Liberia has experienced internal conflict that has led to many Liberians fleeing to Sierra Leone. Both groups, the returning refugees and those

fleeing conflict elsewhere, have added stress to post-war redevelopment efforts by reviving concerns about widespread poverty among the displaced, access to health care, and the availability of employment in an already limited job market.

Current levels of urbanization appear relatively low at 38% (World Bank, 2010), however the manner in which this urbanization has manifested is problematic. Compounding refugee displacement issues internal displacement has also deeply impacted societal structure in Sierra Leone. Driven by poverty, lack of opportunity in rural areas, and the threat posed by civil war millions of people, both those who had been displaced by violence and those simply seeking economic opportunity, have converged in the capital, Freetown. This influx in population is associated with the creation of peripheral slum areas that pose increased health risks, pressures to government infrastructure and, since they are largely populated by disenfranchised and unemployed youth, concerns have been raised about the prevalence of criminal activity and the potential for renewed unrest.

The age structure of Sierra Leone reveals a very high percentage of young people, with those 0-14 comprising 41.8% of the population (Dumbuya, 2011). The poorest sector of Sierra Leone's population was (and still is) those between the ages of 15-24. This is largely due to the previously mentioned widespread unemployment among youth; it is estimated that approximately 70% of young people in Sierra Leone are unemployed (Dumbuya, 2011). The presence of such high numbers of unemployed youth has the potential to pose serious security threats. This has been illustrated by the civil war which some feel was caused, in part, due to youth uprisings. While Richard Fanthorpe and Roy Maconachie discuss this phenomena and point to the collapse of "public services [that] left many young people unable to complete an education, find paid work, marry, and set up a family" (Fanthorpe & Maconachie, 2010, p. 252) as probable causes for the unrest amongst youth they also recognize that in post-civil war Sierra Leone youth are "leading a [...] resurgence of horizontal and interest-based associational life" (Fanthorpe & Maconachie, 2010, p. 256). This assertion that youth are a potentially revitalizing force in the redevelopment efforts highlights the importance of mitigating disenfranchisement through support and programs.

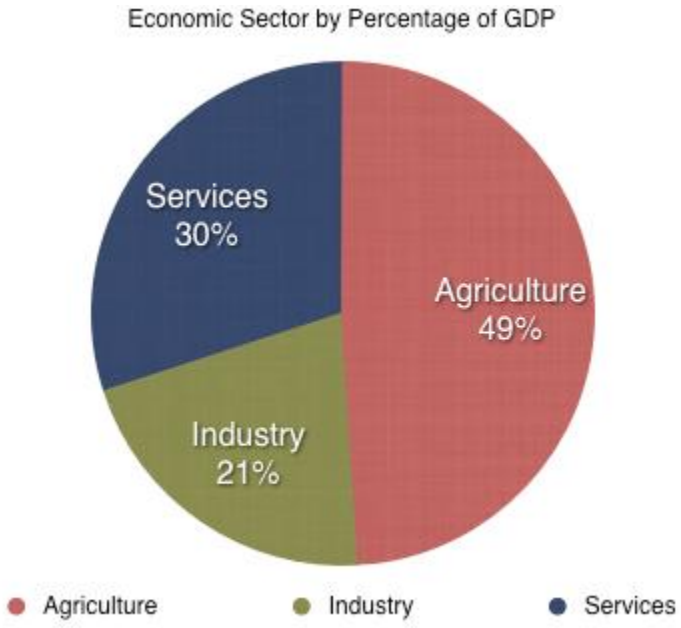
Another aspect of demographics that is central to both social and economic representation in Sierra Leone is the prevalence of ethnic division (Dumbuya, 2011). 20 different

African ethnic groups reside in the country, but the two major ones are the Temne comprising 35% in the North and the Mende comprising 30% in the South (World Bank, 2010). These demographies of ethnicity are important in Sierra Leone due to ethno-regional political patterns that deeply effect the reestablishment of democracy by distorting political representation. This division between the Temne and the Mende has deep colonial roots and it should be noted that the politicizing of identities extends into government institutions such as police, military, and civil service (Dumbuya, 2011). More than simple need for electoral reform is needed in order to disengage from potentially discriminatory ethnic associations.

While demographics are often thought to simply represent straightforward facts about a region, it is important to analyze and contextualize the data. In the case of Sierra Leone this investigation has the potential to uncover some of the underlying causes of past conflict and point towards possible solutions.

Informal Economy

Activities of economic generation by percentage of Gross Domestic Product (GDP) in Sierra Leone are divided with services accounting for 30%, industry for 21%, and agriculture for 49% (World Bank, 2010).



Although GDP is an acceptable measure of national economy in most cases, the informal economy of Sierra Leone skews this data. The International Conference of Labour Statisticians defines the informal economy as:

"The informal sector is regarded as a group of household enterprises or unincorporated enterprises owned by households that includes: informal own-account enterprises, which may employ contributing family workers and employees on an occasional basis ; and enterprises of informal employers, which employ one or more employees on a continuous basis." (Employment Sector International Labour Office, 2002)

An excellent example of this issue is in the agricultural sector. While agriculture is central to GDP production in Sierra Leone at nearly 50%, economists estimate that the majority of the agricultural industry transpires in the informal sector. This is a reflection of various developmental dilemmas including the widespread participation in subsistence farming whereby, if there is crop surplus it is traded with other subsistence farmers or sold at market. Due to the diamond boom, many agricultural workers abandoned rice fields for diamond mines, this led to importation of staple foods and a significant jump in food prices (Dumbuya, 2011) (Fanthorpe & Maconachie, 2010). Subsequently, many people recognize that due to the expense of food they may be better off practicing subsistence agriculture. This movement back to farming paired with increased mechanization is hoped to revitalize Sierra Leone's agricultural sector; not only making it internally viable, but increasing the potential exportation to the international market. Fanthorpe and Maconachie acknowledge that this "new sense of self reliance" has the potential to "represent a more durable basis for democratic change" evoking the knowledge that economic stability begets political stability (Fanthorpe & Maconachie, 2010).

The informal economy in Sierra Leone is estimated to comprise approximately 45 percent of the GDP (Dumbuya, 2011) and The Census of Business Establishments estimates that two-thirds of businesses are not registered with any government agency. While it is often essential to survival in impoverished nations, wide-spread participation in Sierra Leone's informal sector can actually continue the cycle of poverty. This is effectuated through loss of taxation revenue for governments that thus renders infrastructure and programs funding less feasible. It is also detrimental to foreign investments as the lack of statistically relevant economic activity may discourage outside investors. While the costs of the informal economy are obvious on at a national level, the social costs to individuals cannot be overlooked. Informality can lead

to job insecurity, lack of access to financing, being barred from participation in government funded business incentive schemes, and difficulty promoting growth due to the complications of training and expanding staff.

The process of economic development and growth in Sierra Leone begins with the legitimization of small businesses.

Where Sierra Leone fits into the global economy?

Sierra Leone is a country that has been troubled by economic problems throughout history and has had a very difficult time recovering from the civil war and the resulting financial problems. Sierra Leone is ranked very low in both the world and the Sub-Saharan Africa region by the Index of Economic Freedom. Sierra Leone's Gross Domestic Product (GDP) is also low at 4.7 billion (Index of Economic Freedom, 2012). This initially appears high but in comparison to developed nations, like Canada whose gross domestic product is 1.3 trillion, the undevelopemen of Sierra Leone is put into perspective. It has been estimated that the GDP will rise over the next few years, but only time will tell.

Throughout the world, Sierra Leone is considered to have a very low economic status. Overall Sierra Leone is ranked 152 out of 179 countries (Index of Economic Freedom, 2012). Of note is the fact that all the countries in the world are not ranked however Sierra Leone still holds a very low position on the index. The Index of Economic Freedom has given Sierra Leone an economic score of 49.1; a score that has fallen by half a point since last year. This is, in part, caused but the structural and infrastructure problems Sierra Leone is currently facing. The economic rank is also lower than the global average which has a score of 59.5 (index of Economic Freedom, 2012). Out of the 46 countries comprising the Sub-Saharan region of Africa Sierra Leone is ranked at 34 making it obvious that Sierra Leone is having economic troubles both globally and on a local scale.

In another survey done by International Finance Corporation, Sierra Leone was rated in eleven different categories. All these categories are designed to measure the ease of doing business in the respective countries. In this survey 184 countries were ranked and evaluated. Sierra Leone rated in the bottom bracket of the rankings except a couple of the categories such as starting a business and protecting investors (Ease of Doing Business in Sierra Leone, 2012). Out of all the countries rated, Sierra Leone was in the bottom twenty for getting electricity around the

country and in the bottom 50 for attainment of credit; a score that continues to fall. There has been a massive improvement in categories such as paying taxes, enforcing contracts, and trading across borders. The trading across borders has likely increased due to the diamond mines throughout Sierra Leone (Ease of Doing Business in Sierra Leone, 2012). Even with some decent statistics it is still apparent that Sierra Leone has a problem in dealing with construction permits which has dropped three rankings in a year. Out of all the 183 countries ranked in the Sub-Saharan area Sierra Leone was ranked 141; a nine point improvement over the last year alone but still a poor outlook by comparison.

Chart 1.1 Ranking of Sierra Leone out of 183 Countries in respected topics

Topic Ranking	2012 Rank	2011 Rank	Change in Rank
Starting a Business	72	59	-13
Getting Electricity	174	175	+1
Trading Across Borders	132	137	+5
Enforcing Contracts	141	146	+5
Getting Credit	126	116	-10
Paying taxes	76	160	+84

In this chart it shows the ranking of six topics that a business needs to be successful. The farther away from 183 the better so as you can see the bottom three are not very strong but starting a business in Sierra Leone is a right in the middle of the ranked countries. Enforcing contracts is the topic that looks at the efficiency of contract enforcement by following the evolution of a sale of goods, tracking the time, cost and number of procedures involved from the movement of files until the actual payment. The other topics ranked are paying taxes which are the measure of tax systems from the point of view of a domestic company complying with the

different tax laws and regulations and getting credit which is the effectiveness of collateral and bankruptcy laws that facilitate lending.

Throughout the country property ownership rights are highly limited and pervasive corruption is still a heavy drag on private–sector developments. Sierra Leone is heavily dependent on their agricultural sector of economy and the dominance of the agricultural economy leads to a lack of economic dynamism (Ease of Doing Business in Sierra Leone, 2012). Additionally the infrastructure in Sierra Leone is very poor and impedes the expansion and diversification of a productive base for Sierra Leone to make future improvements to existing infrastructure.

Ever since the civil war in Sierra Leone various government financial programs have be weak. The Gross National Income (GNI) is $340 US which is dreadfully low and renders it difficult for individuals to attain economic independence (Index of Economic Freedom, 2012). The poor GNI compounds credit issues; the government lacks capacity to provide sufficient credit for growing businesses which simply contributes to the cycle of unemployment and poverty.

Even thought the economy of Sierra Leone looks very bleak at this time there has been thought that it will improve. The Index of Economic Freedom believes that, within a year, Sierra Leone's economy will rise by 5.2% and in two years rise by 6%. In addition to this Sierra Leone has invested in improving its legal and physical infrastructure and has also taken steps to advance the tax administration process and public debt management.

Where natural resources fit into Sierra Leone economy?

Sierra Leone is a country that is surrounded by some of the wettest rain forests in the world and some of the rich deposits of diamonds, titanium ore, bauxite, iron, ore and chromite (Powlick, 2005). Although it is easy to imagine these resources as a blessing, the reality in Sierra Leone has been quite opposite. This is particularly relevant in the case of diamond mining in Sierra Leone, as the diamond boom was a source of the tensions that brought on civil war.

The main resource in Sierra Leone is the alluvial diamonds, and since their discovery in 1932, the country has shipped out over 32 million carats of these diamonds (Powlick, 2005). It is quite

apparent that exportation of diamonds is the main source of economic generation for Sierra Leone in the global economy. Even though these diamonds are sought by wealthy elite throughout the world, the diamond mining industries does not offer many jobs. This is because the diamonds are alluvial, meaning they are dispersed throughout the ground, and this dispersion renders them easy to find and extract with the use of minimal technology. The most used method to find these diamonds is simply sifting through dirt from the river bottoms. An individual miner can unearth several carats in one day's works. Due to the ease of labour and minimal technology involved the wage for this work remains low making it very difficult for diamond miners escape the cycle of poverty. To add on to this, not all the diamonds that are unearthed can be used for export, totalling onto the stress of the workers not meeting a minimum wage (Powlick, 2012). Additionally, most of the money that is earned mining these diamonds is extorted by the middle-men and paid to large multi-national corporations instead of to the individuals performing the manual labour (Powlick, 2012). It is impossible to miss the irony that Sierra Leone is one of the poorest country in the world all while it has a rich set of natural resources and minerals, including diamonds.

When it comes to the timber, there is no industry because logging in Sierra Leone has being banned to conserve the forests and to prevent degradation (Kilbery, 2011). If logging did occur in Sierra Leone it would have substantial and negative impacts on the environment. To support this thought President Koroma declared that to export timber from Sierra Leone would be illegal. Unfortunately, even with this law in place there has been many documented times of people illegally logging (Kilberg, 2011). To export these illegally logged trees one just has to get the cash to the right people and, like in the past, money is speaking larger than words (Kilbery, 2011). To make things worse the massive logs that come from the forests of Sierra Leone are in high demand in China making the illegal trade even more profitable. At the rate that China wants these logs there is fear conflict may be renewed if the price of timber increases. It is thought that if this happens timber might become the next "blood resource in Sierra Leone (Kilbery, 2012). If Sierra Leone could gain and maintain control of the timber resource that is being illegal exported there is a possibility to produce an industry and create jobs effectively strengthening the economy.

The oil industry in Sierra Leone has been burgeoning since the discovery of oil in West Africa. Sierra Leone is hopeful that the oil industry could develop their mining and energy industries after years of conflict that basically destroyed investments from other countries and left their infrastructure in ruins (The Cocorioko, 2012). The only problem with the oil that has been discovered are the bureaucratic processes that will delay the extraction and sale of oil by five to seven years. Even though nobody will see the oil from these new oil patches for some time, Sierra Leone's President believes that this oil will produce on economic boom for his country and leading them into economic prosperity (The Cocorioko, 2012).

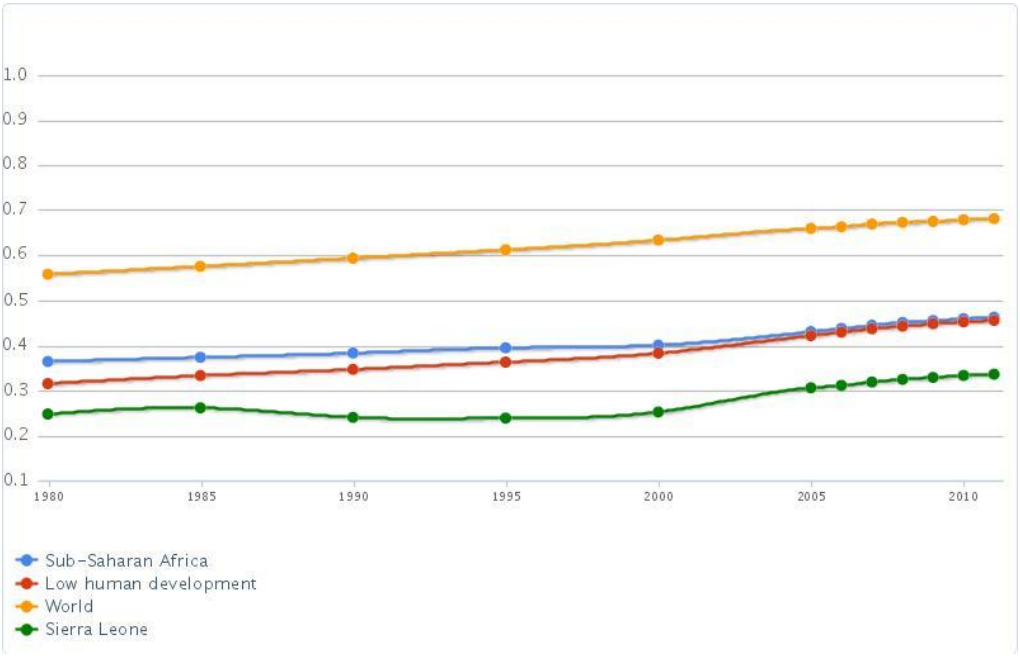
Overall the natural resources for Sierra Leone have being a blessing and a curse for the country. The Diamonds are some of the best in the world but contributed to the civil war and continued the war into some of the bloodiest days in Sierra Leone's history. The timber in Sierra Leone is illegal to log but many rebels log it regardless due to the high demand in China and around the world. This illegal logging has lead to small conflicts with the leaders of Sierra Leone and some people fear that illegal logging of the timber could lead to timber being the next "blood" resource in Sierra Leone. When it comes to oil Sierra Leone is doing very well. They just discovered a new oil patch just off their shores of the country and the President is expecting an economic boom when their oil industry starts to take off. This will lead to many new jobs for the people of Sierra Leone. In general Sierra Leone's natural resources have lead the country to being one the poorest in the world but with this new oil they may be capable of overcoming hardships and perhaps one day the world can look at them as a developed country and not a poor country that is only good for "blood diamonds".

Sierra Leone's Redevelopment In Relation To The HDI

Sierra Leone continues to be afflicted from the past by the catastrophic civil war which was waged from 1991 to 2002. The war has left its mark by contributing to the deaths of many people in the country, more than a third of the population has been displaced as a result (Country profile: Sierra Leone, 2010). The country's infrastructure was also decimated by the conflict . For these reasons and many more Sierra Leone has been placed as one of the lowest ranking countries in the United Nations Development Programme's Human Development Index, positioned at 180 out of 187 countries and territories (International human development indicators, 2011).

Each year since 1990 the Human Development Report has published the Human Development Index (HDI) which was introduced as an alternative measure of national development, such as level of income and the rate of economic growth (Human development report: Sierra leone, 2011). The HDI provides a composite measure of three basic dimensions of human development: health, education and income. This system of ranking is extremely beneficial for assessing the need of development and aid for many countries, inclusive of Sierra Leone.

Currently Sierra Leone's HDI is 0.336, which gives the country a rank of 180 out of 187 countries, a very low human development category (International human development indicators, 2011). However, according to the Human Development Report the country's value has increased since 1980 from 0.248 to 0.336, a small boost in the ranking but still important for a nation which is in desperate need of development. Sierra Leone is located in the Sub-Sahara region in Africa, the HDI for the region is currently 0.463 which has increased from 0.365 in 1980 (International human development indicators, 2011). This puts the country at not only one of the lowest ranked countries in the world but also in its region, significantly.



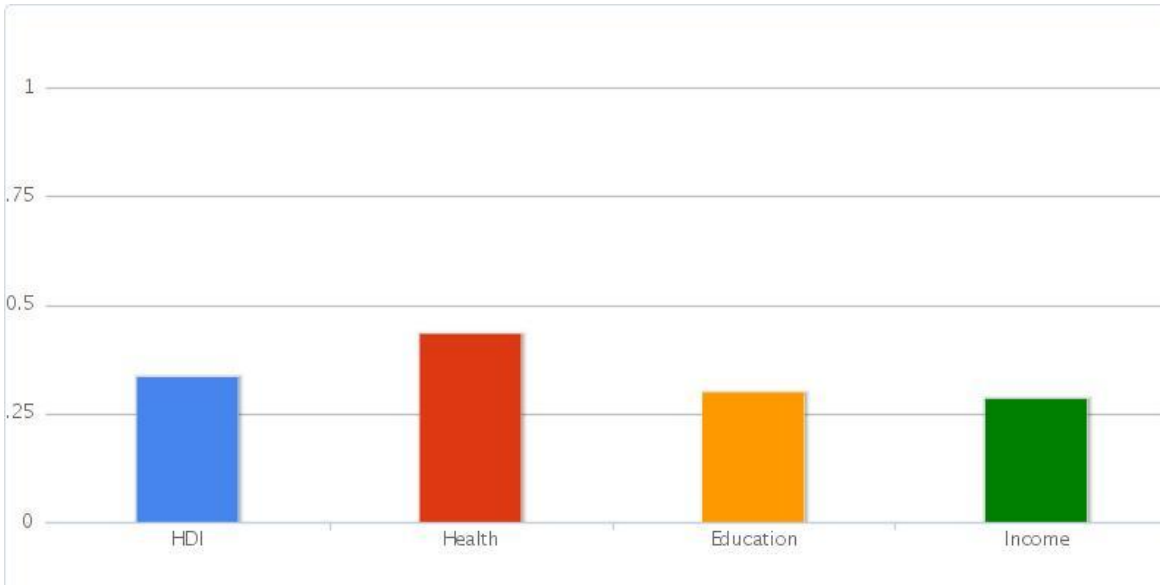
This graph represents the HDI for Sierra Leone in relation to the countries region, globally, and compared to other low human developed countries from 1980 to 2010 (International human development indicators, 2011).

Certainly Sierra Leone's past civil war has affected the country greatly, this outcome can be seen clearly in the above graph where the time while the civil war was in effect, for just over a decade, is apparent. This can actually be seen in other forms of data as well, specifically, it is apparent in the table below.

	Life expectancy at birth	Expected years of schooling	Means years of schooling	GNI per capita (2005 PPP$)	HDI value
1980	43.1	4.8	1.0	752	0.248
1985	42.9	5.8	1.2	689	0.262
1990	38.7	4.8	1.6	607	0.241
1995	37.2	5.6	1.9	503	0.239
2000	39.8	6.9	2.2	395	0.252
2005	44.3	7.2	2.6	620	0.306
2010	47.4	7.2	2.9	720	0.334
2011	47.8	7.2	2.9	737	0.336

Table: Sierra Leone's HDI trends based on consistent time series data (Human development report: Sierra Leone, 2011).

The above table reviews Sierra Leone's progress in each of the HDI indicators. Between 1980 and 2011, Sierra Leone's expected years of schooling increased by 2.5 years, life expectancy at birth increased by 4.7 years and mean years of schooling increased by 1.9 years. However, Sierra Leone's GNI per capita has decreased by about 2.0% between 1980 and 2011 (Human development report: Sierra leone, 2011).



Graph for Sierra Leone's current rankings in relation to Health, Education, Income, which in turn represent the countries HDI (International human development indicators, 2011).

The civil war not only left the physical resources of the country in disrepair but also the human resources. Before the war, Sierra Leone had quite average standards for a country with lower development. Although the country was, no-doubt, in need of certain types of development the situation was not dire. The war quickly changed this. Two-thirds of the population were illiterate, life expectancy dropped drastically to became one of the worst in the world, and the country's quality of income severely dropped (Human development report: Sierra leone, 2011).The country has been in a slow process of regaining its original standards and surpassing them; working towards overall betterment and redevelopment for the country. Sierra Leon's redevelopment can be seen within the trends of data in the Human Development Report of the country's HDI. While certain indicators of the country's health have been rising slowly, for example school attendance and life expectancy, every small step aids in the country becoming a better place to live for the people.

Social Programs

Social assistance programs are a necessity for Sierra Leone. The people are certainly in need for any help they can receive and though the government attempts to do its part by providing such programs, the majority is provided by outside agencies such as Non-Government Organizations (NGOs) and charitable agencies. Social insurance exists within the country for the people offering them old age, disability, survivor, and even work injury benefits to those that qualify (Country profile: Sierra Leone, 2010). It is great that the country has these programs, although the monetary compensation that the people receive is very little.

A great programme that the country offers is Cash for Work, a youth employment scheme. The programme aims to provide employment to consolidate the peace process (Country profile: Sierra Leone, 2010). It targets ex-combatants, unemployed youth, returnees and refugees by offering them work. This work includes cleaning streets, data clerks and even work in agriculture where they receive payment of Le 150,000 per month (approximately $46 US a month, or $2 US a day) (Country profile: Sierra Leone, 2010). A great programme to provide some work but those that work receive little money and the programme lacks a vision for long-term sustainability as there is no link with long-term skills and poor employment structures.

Sierra Leone's government also offers a social safety net programme. This provides support to the poorest among the vulnerable groups, where they are not being reached by existing interventions (Country profile: Sierra Leone, 2010). Those that can receive the benefits from the program are those that are either disabled, widows, aged 60 and over, and orphans/separated children. Other determinations for the programme are that the person qualifying must have either, no regular means of support, inability to work, aged 60 years and above, or have no regular income. Those that receive the aid from the programme are given either $10 US per person, monthly, or food with the worth of $10 US is distributed to those living where markets may not be available (Country profile: Sierra Leone, 2010). The social safety net programme has been found to increase enrolment in schools, increase access to medical facilities, reduce the depth of poverty, as well as ensure food security (Country profile: Sierra Leone, 2010). Unfortunately, there are concerns that this programme does not directly support economic activity and that the process of identifying the most vulnerable people is very costly.

There is concern that the people will become too dependent on the government's post conflict assistance programmes, especially those that are simply seen as easy handouts. Such as the direct cash transfer programme that targets the elderly and most vulnerable who have no other means of support (Country profile: Sierra Leone, 2010). A simple programme to receive coverage for, those that do qualify receive Le200, 000 ($62 US) every six months and others can receive that pay every three months (Country profile: Sierra Leone, 2010). However, there are those people who will never be able to support themselves and need so-call handouts in order to develop sustainable livelihoods and survive.

The country itself can only do so much from within the government, for this reason Sierra Leone relies on much aid from out of country sources. One such out of country aid group called Restore Hope Sierra Leone. Restore Hope works with the Sierra Leone people through unified strategies and other international partners to improve infrastructures, social responsibility and capacity for development (Restore hope, 2011). The group currently has 10 projects active within the country which all have shown great successes. Restore Hope Sierra Leone has great initiative and provides great social assistance to help redevelop the country.

Another social program that has had great success in providing Sierra Leone with aid is the National Social Action Project (NSAP). The NSAP was designed to provide an immediate

and tangible response to the gaps in basic service availability, with the priority on the areas and populations most affected by the war (Sierra leone: National social action project, 2011). NSAP has achieved great results by helping over 700,000 people gain access to health facilities, 360,000 children to educational facilities, and over 115,000 people to economic infrastructures such as markets.

Sierra Leone experienced an influx of external subsidies after the civil war, however this funding is dwindling. In order for the country to continue to develop and maintain what little social programs they have, the focus on economic growth is essential.

Sierra Leone's Special Court

The Special Court for Sierra Leone is an independent judicial body set up to "try those who bear greatest responsibility" for the war crimes and crimes against humanity committed in Sierra Leone after November 30th, 1996 during the Sierra Leone Civil War (Kamara, 2009). On January 16th, 2002, the UN and the Government of Sierra Leone signed an agreement to establish the court. The first staff members arrived to begin their duties in July 2002. Located in the country's capital, Freetown, the special court has made its mark in redevelopment for Sierra Leone significantly by putting those held responsible for their crimes within the country to justice.

The Special Court is the first in history to find an accused person guilty of the crime of conscripting children and forcing them to participate in hostilities (CITE). The court is also the first in world history where all three accused Revolutionary United Front (RUF) leaders were convicted for the crime of "forced marriage" as a separate "crime against humanity", recognizing the particular suffering inflicted upon women through conscription as "bush wives" during the conflict in Sierra Leone (Kamara, 2009). The special court has also put those to justice for sexual slavery and any other form of sexual violence, and for intentionally directing attacks against Peacekeepers (Kamara, 2009).

Sierra Leone's Special Court has put many individuals to justice for their crimes against humanity including Alex Brima, a member of the AFRC, one of the most notorious and serving the longest sentence of 50 years imprisonment in Rwanada (Kamara, 2009). Morris Kallon, Brima Kamara, and ten more individuals have been successfully tried and serving sentences for war crimes and crimes against humanity. There are currently eight on trial at the Special Court.

As Sierra Leone is currently in a redevelopment phase since the tragic rebellion that caused the civil war, those held responsible need to be convicted for their crimes. It has been a slow process but extremely necessary for the country to continue on its steps in redevelopment.

Conclusion

Overall Sierra Leone is a country in dire need of redevelopment and support from the global community. The country is rich in natural resources and provided these resources are well controlled, Sierra Leone has the potential to derive extensive wealth. The most economically important, and easily the most famous resource, diamonds, has lead to military conflicts and a civil war which lasted ten years. People in Sierra Leone believe that the next resource which is lumber, may one day also lead to bloody fight over the rights to log. This would represent the worst possible outcome for the country that already has one of the lowest world economy rankings. Even in Sub – Saharan Africa they are ranked low in many different categories like getting electricity to the people and producing small businesses. In order to increase their world ranking in economics, the internal economy must be formalized and the resources which play such an important role in global exports must be regulated. The current economy in Sierra Leone relies heavily on informal transactions that do not yield taxable results. In turn, this means that the government is limited in revenue sources. These limitations lead to a lack of government supported programs and infrastructure. There is specific data that shows the effect of the civil war on Sierra Leone, this is particularly apparent in the HDI report. This has been able to give a statistical point of view for Sierra Leone in relation to its improvement and redevelopment since the civil war. With what money the government has available, the country is able to provide some social assistance programs to the people of Sierra Leone. Despite the great intentions of the programs, they only offer little benefits to the public and there are concerns that they are not truly supporting the economy but rather simply offering handouts. Although economic realities are essential to redevelopment, the Special Courts of Sierra Leone have been important step towards the social aspect of redevelopment. The court has been able to convict those guilty for war crimes and crimes against humanity during the civil war and making huge progress for the country in relieving the people of their horrific past.

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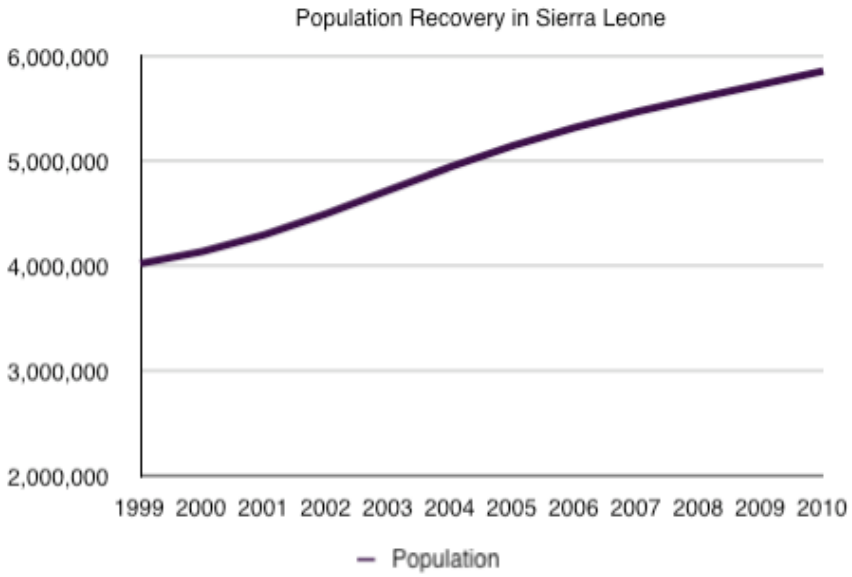
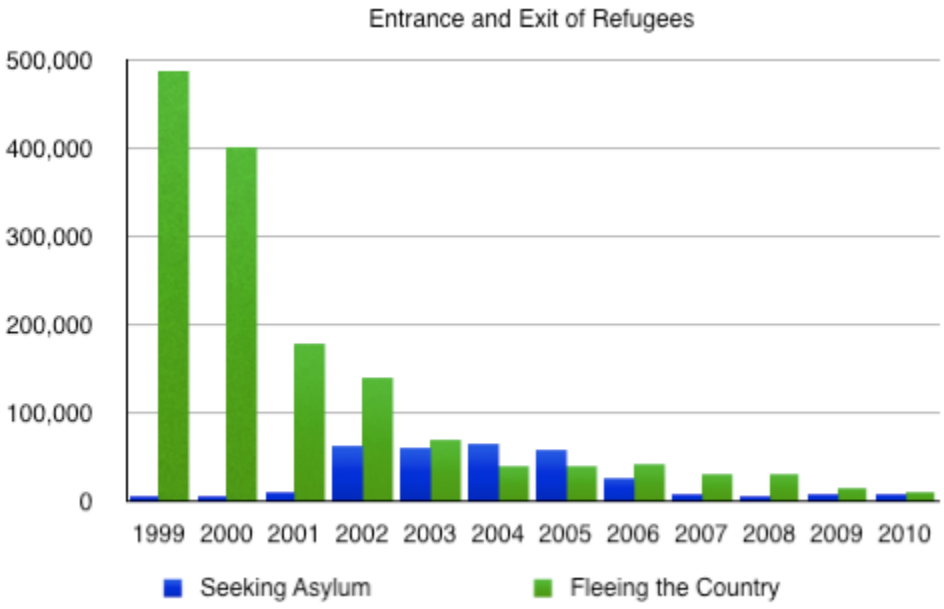
Appendix


Population Recovery in Sierra Leone
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Population


Entrance and Exit of Refugees
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200,000
100,000
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1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Seeking Asylum
Fleeing the Country

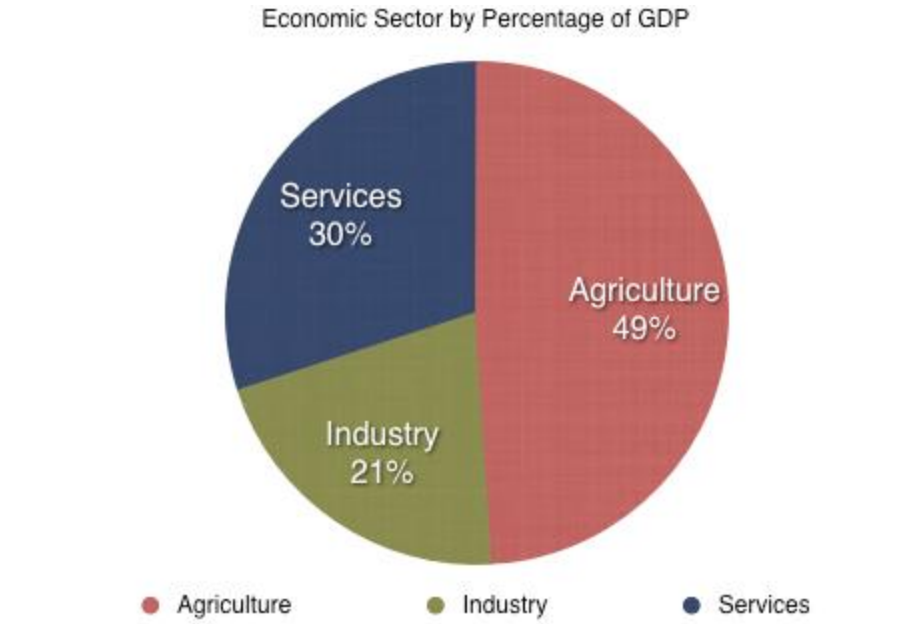
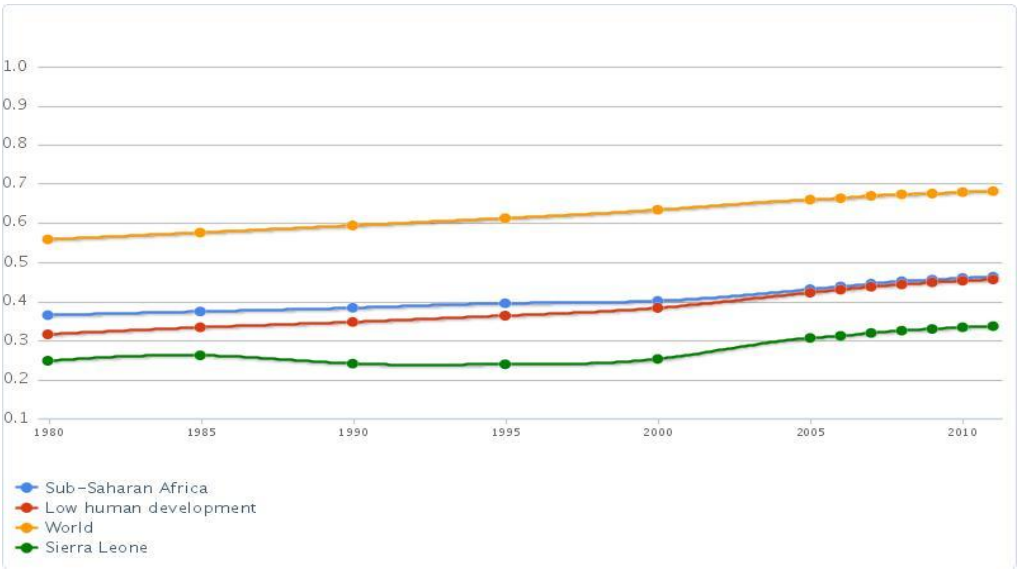


Chart 1.1 Ranking of Sierra Leone out of 183 Countries in respected topics

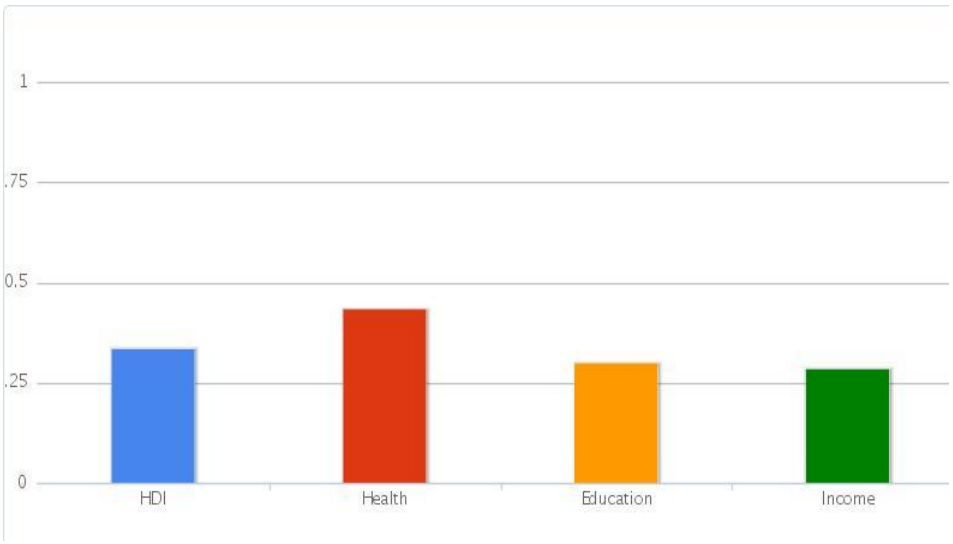
Topic Ranking	2012 Rank	2011 Rank	Change in Rank
Starting a Business	72	59	-13
Getting Electricity	174	175	+1
Trading Across Borders	132	137	+5
Enforcing Contracts	141	146	+5
Getting Credit	126	116	-10
Paying taxes	76	160	+84



This graph represents the HDI for Sierra Leone in relation to the countries region, globally, and compared to other low human developed countries from 1980 to 2010 (International human development indicators, 2011).

	Life expectancy at birth	Expected years of schooling	Means years of schooling	GNI per capita (2005 PPP$)	HDI value
1980	43.1	4.8	1.0	752	0.248
1985	42.9	5.8	1.2	689	0.262
1990	38.7	4.8	1.6	607	0.241
1995	37.2	5.6	1.9	503	0.239
2000	39.8	6.9	2.2	395	0.252
2005	44.3	7.2	2.6	620	0.306
2010	47.4	7.2	2.9	720	0.334
2011	47.8	7.2	2.9	737	0.336

Table: Sierra Leone's HDI trends based on consistent time series data (Human development report: Sierra leone, 2011).



Graph for Sierra Leone's current rankings in relation to Health, Education, Income, which in turn represent the countries HDI (International human development indicators, 2011).

5 BRICS: A Significant Economic Force in Today's World Economy

Mitchel Blais, Genna Purcell, and Michael Caldwell

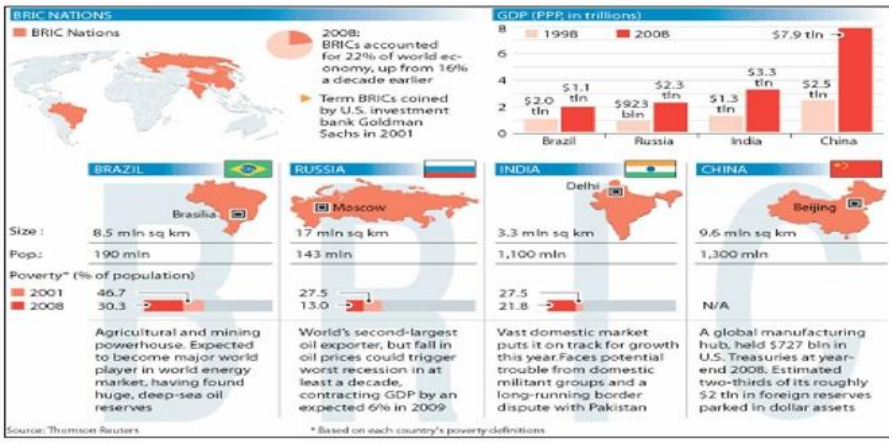
The BRIC acronym was formed in 2001 to represent the alliance between Brazil, Russia, India and China. Recently South Africa joined the alliance to form the BRICS. Currently, numerous developed and developing countries rely on trading with the BRICS due to the huge markets and abundance of natural resources. This paper will examine how certain characteristics of the BRICS have led them to become a significant economic force in the world economy. Every country in the BRICS has something to offer. For example Brazil, Russia and South Africa have the resources while India and China have the market and labor force.

Throughout the last 20 years, Brazil has developed rapidly due to increased trade. President Lula da Silva the leader of the Workers Party has restructured Brazil to increase the quality of life. For example, Bolsa Familia is a social assistance program provided for poor families. The program has helped raise numerous families out of poverty thus, ultimately helped drive the Brazilian economy. Similarly, Russia was in ruins after the fall of the Soviet Union in the early 1990's. However, President Vladimir Putin restructured Russia's policies and jump started their economy. Therefore, Russia's economy has flourished due to their abundance of oil and natural gas (Guangcheng, 2009). As world demand for oil and natural gas increases, Russia's resources will be important to consumer countries such as the United States and China. Furthermore, India and China house the two largest populations in the world. Many citizens in India and China are still poverty stricken. However, over the last 10 years there has been an increase of people joining the middle class. Due to outsourcing jobs, China and India have benefitted because more people are engaged in the formal sector which pays taxes to their government. The taxes are continually used to reinvest into their country to improve the quality of life. South Africa only recently joined the BRICS alliance. South Africa is leading all African countries economically due to their abundance of natural resources in the form of heavy metals. Gold, platinum and magnesium are heavily mined in South Africa thus, enhancing their economic power as these metals are in huge demand globally. Similar to Brazil, the South African president Thabo Mbeki has restructured policies that made them one of five top

emerging economies in the world. Therefore, the alliance between Brazil, Russia, India, China and South Africa is extremely influential due to there rapid expanding economies.

In 2010, Brazil's gross domestic product (GDP) was over two trillion US while sustaining a population of 195 million citizens (World Bank, 2011). Brazil, Russia, India and China are the only developing countries with a GDP over one trillion US. Brazil's economy has thrived due to their abundance of natural resources. According to figure 1, Brazil is the largest producer of oil in Latin America and contains the largest iron ore reserves and the most abundant rainforest on earth (An et Brown, 2010). In 2011, more offshore oil discoveries boosted their GDP to a 7.5% annual growth rate. At this rate, Brazil nearly doubles the OECD average (Beer et al, 2011). Furthermore, Brazil is the only country in the BRICS experiencing population growth, rising incomes and financial gains thus, enhancing their global economic power. However, Lula da Silva the previous President of Brazil is the main reason why Brazil has become an economic force. President Lula da Silva led the Workers Party that emphasized the need for structural change in the shape of land-reforms and expansion of workers rights to overcome inequality in Brazil (Bohn, 2011). Silva redesigned Brazil's social programs and created a new program called Bolsa Familia (family allowance). The family allowance is a cash transfer program for lower class citizens throughout Brazil. This allowance provided financial resources for poor families on the condition that they would make sure their children were attending school and have good health and nutrition. Similarly, expecting mothers or nursing women must be kept physically and nutritionally healthy (Bohn, 2011). Individuals and families were expected to outgrow the need for cash transfers as they become lifted out of poverty thus, becoming an economic contributor in Brazil. Bolsa Familia was widely used in the Northeastern part of Brazil where 69.1% of families received cash transfers due to the abundance of aboriginals. In 2003, 4.1 million families

Figure 1, An. L. et Brown. D.



received financial help, 2004 the number increased to 5.7 million families and by 2007 11.1 million families or 45 million individuals received cash transfers (Bohn, 2011).

Bolsa Familia (Brazil)	# of Families Receiving Assistance
2003	4,100,000
2004	5,700,000
2007	11,100,000

Figure 2 Bohn, 2011.

Silva successfully ımplemented socıal programs such as Bolsa Familia to reduce Brazil's inequality and strengthen their country. Bolsa Familia is one factor that has given rise to a new middle class not previously seen in Brazil. Previous inequality in Brazil prevented them from becoming a developed nation. Today's middle class boom is not like the Industrial Revolution where prosperity became a method for improving individual and political freedom. Brazil's middle class can now afford private schools therefore, redefining their traditional roles which will ultimately redefine the world (Bryant, 2011). Megamalls are now being built throughout Brazil. For example, Jardim Guadalupe is a new mega mall in Sao Paulo Brazil that will be the hub of middle class desires. The mall will have a food court, six megastores, 250 small shops, a university, private highschool, gym, medical centre, cinemas and a bowling ally (Bryant, 2011). Jardim Gualalupe Mall symbolizes the existence of a new middle class based on consumerism, similar to developed countries such as the United States. In five years from 2003 to 2008 over 24 million Brazilians were lifted out of poverty and now Brazil's middle class accounts for 50% of the population, confirming Lula's policy efforts were successful (Bryant, 2011). Middle class citizens now enjoy colour television, washing machines, refrigerators and vacuum cleaners thus, raising the standard of living.

Furthermore, Silva paid off all international monetary loans and began to focus on multilateralism. Multilateralism can be defined as an arrangement between two or more countries where each will benefit. Silva's multilateralism conception was based on a global system having a multipolar tendency and power dispersion. Brazil's foreign policy reflected humanistic objectives seen on the streets as an instrument for national development (Visentini et Silva,

2010). For example, promoting free trade, building up advanced technology and searching for productive investments was Lula's main objective as these are the tools in national development. Technology plays a key role as it raises citizen's standards of living. Brazilian's now have appliances such as refrigerators and washing machines whereas before appliances were unheard of because there was a lack of electrical lines connected to houses. Free trade is very important as the flow of capital is what drives the Brazilian economy. Therefore, the alliance between the BRICS is extremely vital as resources flow from one country into the other. The BRICS trade freely between on another and hold forty percent of the worlds total reserves. One sixth of their reserves are the total size of the International Monetary Fund exemplifying the sheer power of the BRICS (Economist, 2010).

Brazil settled many disputes against developed countries to increase their multilateral policies. For example, Brazil took Canada to the World Trade Organization (WTO) and won the dispute over subsidies concerning the sale of Bombardier airplanes in 2001. In addition, Brazil took the United States to the WTO over cotton subsidies. Brazil argued the United States purposely inflated the market with subsidies to provoke a decrease in price on cotton fiber (Visentini et Silva, 2010). The developed countries continually suppress developing countries by subsidizing commodities thus, becoming very competitive on the world markets. Therefore, countries such as Brazil are not able to compete with developed countries low prices. Lula has also focused his policies on environmental multilateralism. In 2009, at the UN General Assembly, Lula pushed for more research and investment on renewable resources. According to Brazil, developed countries have more responsibilities in environmental issues than developing countries (Visentini et Silva, 2010). Lula is raising awareness that climate change is everyone's fault. Pointing the finger at developing countries will not reverse climate change; Lula wants to see a joint effort between countries in reducing emissions. The environment is the third objective on Lula da Silva's agenda behind poverty and hunger. Lula took interest in the Clean Development Mechanism (CDM) which allows for investment in projects that reduce greenhouse gases. The environment is amongst Brazil's top priorities whereas the environment is not as important for developed countries such as Canada. Investing in the environment is extremely important for Brazil as the country relies on their natural resources. This will ultimately re-enforce Brazil's global economic power due to the creation of new technology and jobs in environmental research and development.

Throughout the 1990's, Russia was politically and economically instable. Today, Russia has become a major influence due to their stable government and abundance of resources. Russia has the world's largest mineral and natural gas reserves, second largest coal reserves and the seventh largest oil reserves. In addition, Russia houses the largest fresh water reserves on earth (Guangcheng, 2009). Similar to Brazil, Russia's economy relies on their abundance of natural resources. Their fresh water reserves provide hydroelectric power to neighboring countries thus, enhancing their influence as many countries rely on Russia for electricity. Russia's oil and gas reserves are becoming increasingly important as the global demand for oil and gas is increasing. Russia is one of the top producers and exporters of oil and gas. However, they rank seventh in proven oil reserves behind Saudi Arabia, Iran, Iraq, Kuwait, United Arab Emirates and Venezuela (Bahgat, 2010). In 1988, the Soviet Union produced 12.5 million barrels of oil a day. During the 1990's oil production dropped by 50% due to political and economic instability. However, during the period from 1998 to 2008 Russia saw a huge increase in production due to global demand (Bahgat, 2010). In 2008, oil prices drastically fell thus, Russia's oil production remained stagnant. In the long term, the decline in oil production symbolizes the aging Siberian Field Reserves; therefore, they must invest more money in exploration to sustain their economic power. Russia is the world's natural gas superpower, the largest producer and exporter and holding 27.3% of the world's proven reserves (Bahgat, 2010). Russia is located in between Europe and Asia, two extremely large markets. Therefore, Europe and Asia's dependence on oil and gas only enhances their economic power. In 2008, the Russian government implemented an energy strategy to increase production by 2030. Oil production is expected to rise from 400 million tons to 535 million tons a year. Similarly, gas production is estimated to increase from 664 billion cubic meters to 940 billion cubic meters by 2030 (Bahgat, 2010). Global demand for oil and gas is continually rising thus; countries such as China are reliant on Russia for their abundant of resources which will increase their economic strength.

Currently, Russia has a population of over 141 million people and a GDP of 1.5 trillion US (World Bank, 2010). Russia's natural resources are extremely important for their expanding economy. With the fall of the Soviet Union in the late 1980's and early 1990's, Russia had virtually zero dollars in foreign exchange. However, by 2010 Russia had a foreign exchange worth $420 billion US (Economist, 2010). The BRICS alliance is very important for Russia as they are now associated with some of the most dynamic economies in the world, China, India,

Brazil and South Africa. Not all roads lead to Washington. The BRICS alliance is a way of demonstrating to the developed world they have their own options.

Russian President Vladimir Putin came into power in 1999. Putin's policies were aimed at enhancing his own hold on power, rejuvenate the economy, balancing the budget, consolidating executive control over the country and maintaining order (Macfarlane, 2006). In 2000, Putin was focused on addressing domestic weaknesses, therefore, creating Russia's National Security Doctrine that is supposed to maintain order. However, the doctrine has helped Putin remove all centers of power, leaving only his own (Macfarlane, 2006). Therefore, Putin's executive autonomy remains unchallenged and Russia's foreign affairs remain unchanged while China and India have increased their foreign affairs. As global demand for natural resources increase, Putin will become more involved in foreign affairs. Since the fall of the Soviet Union, Russia has continually tried to seek access into the international markets. They want a greater role in international economic relations. In 2002, the United States finally recognized Russia as a market economy and began trading with them. President George Bush sought after Russia's resources for their own benefit thus, Bush accepted Russian accession into the World Trade Organization (Macfarlane, 2006). Joining the World Trade Organization is a major step forward for Russia as it adds to their global economic strength.

India is the world's second largest population; with an astounding 1,170,938,000 people in 2010 (World Bank, 2010). While India is still a developing country, they have expanded into a powerful economic engine due to a few key reasons. Firstly, India has lifted restrictions on trade in 1990. However, the Indian government has continued to implement high tariffs on products that ultimately slowed their trade growth (World Bank, 2010). Secondly, India has an abundance of population with a majority of them being poor. Therefore, these poor Indians will work for extremely low wages in order to survive.

India has drastically increased their Gross National Income (GNI) by opening their borders to the world economy.

Figure 3- GNI per capital in India

GNI per capita, Atlas method (current US$)				
1990	1995	2000	2005	2010
390	380	450	750	1330

According to the figure 3, India's GNI per capita has increased steadily since 1995. Between 2000 and 2010 the GNI per capita almost tripled proving India is an emerging economy thirsty for more. Increasing per capita GNI allows many Indians the ability to afford luxury goods they could not afford fifteen years earlier. Trade between countries will occur as the demand for manufactured goods increase thus, expanding their economy. As the demand for goods increases, the opportunity for private entrepreneurs arises because they are required to meet the demand by supplying the goods, which will allow them to turn a profit. As demand grows so does local business and this growth aids in lowering the unemployment rate that fuels growth.

Figure 4: GDP Per Capita

GDP per capita (current US$)				
1990	1995	2000	2005	2010
374	382	453	762	1475

Gross Domestic Product rises as the economy grows. India's economic growth is due to the expansion of investments in local business. In addition, new infrastructure such as roads and bridges throughout India has helped support their expanding economy by enabling faster shipment of goods.

Figure 5- Merchandise Trade in India

Merchandise trade (% of GDP)				
1990	1995	2000	2005	2010
13.1	18.3	20.4	29.1	31.7

The labour participation rate is the ratio between the labour force and the amount of citizens throughout that age group. Despite the growth, the labour participation rate has remained constant at 58% (World Bank, 2010). The steady rate can be attributed to the steady growth in population. The labour participation rate is interrelated with the size of India's labour force thus, confirming India's efforts towards employing their citizens. People who are employed pay income tax to the federal government. The tax revenue generated will help finance developments in infrastructure therefore, improving the standard of living for Indians as cities and villages become more accessible. The three tables: Gross National Income, Gross National Product and Merchandise Trade indicate India's continually strong and steady growth. As India's middle class population continues to grow, the demand for goods will continue to increase thus, help drive their economy. Due to the size of India's population many countries such as Brazil, China, Russia and South Africa want to trade with India which will financially benefit both parties.

Globalization is a growing trend in the world economy. Countries are outsourcing to places such as India and China to save on labour costs. Therefore, more formal jobs are created and people begin to pay more taxes to the government. These taxes will further India's strive to become a developed nation. Most of the outsourcing has to do with Financial Services (41%) and IT jobs (20%) with the remainder being made up by manufacturing and retail. The outsourcing sector employs about 2.2 million people in India benefitting both parties.

There has been a major shift in the way India has developed and how the second largest population in the world has become an important part of the world economy. India has a large population willing to work and new demands in goods and services need to be met by local enterprises in order to supply their large population. Whereas, an increase in foreign trade is due to India relaxing their borders which has ultimately benefitted India because Indians now have

formal jobs paying taxes to their government. Therefore, the government has improved basic necessities such as infrastructure thus, improving India's standard of living.

China is the largest country in the world in terms of population (1,338,299,512) and this very important economically because China has a massive market and labour force. Therefore, many countries want to trade with China to increase their foreign investments. China is currently seen as a developing country with a massive labour force. However, China continues to try and get many citizens out of poverty to increase their citizen's quality of life. Companies are paying their workers minimal wages thus, making it hard for the Chinese government to increase the standard of living. However, access to cheap labour has fueled one of the fastest growing economies in the world by outsourcing jobs.

Figure 6- GDP Growth in China

GDP growth (annual %)				
1990	1995	2000	2005	2010
3.8	10.5	8.4	11.3	10.4

Figure 7- GNI in China

GNI, Atlas method (current US$)				
1990	1995	2000	2005	2010
370,018,692,061	643,556,124,502	1,168,792,749,887	2,265,626,738,147	5,720,811,453,834

Figure 8- Exports of goods and services in China

Exports of goods and services (% of GDP)				
1990	1995	2000	2005	2010
16	20	23	37	39

As shown by figures 6 through 8, there is a steady and significant growth to the Chinese economy, even in light of the world economic down turn that started in 2007. Exports of goods and services have doubled over the last 20 years confirming China's expanding economy. The fast growth rate makes China's demand for raw goods extremely high. Not only is exporting very important to China's growth, but they are also a large consumer of raw goods like steel and wood. Countries such as Brazil, Russia, India and South Africa are supplying China with the raw materials needed to properly develop. The raw materials are used to produce infrastructure to support the growing economy and population. Proper infrastructure will enable people, goods and services to efficiently flow throughout the country. However, there is a downside to infrastructure development. China has approximately 64 million empty apartments that are too expensive for the average worker to afford (Brown, 2010). The Chinese government must focus on providing affordable housing for lower class citizens in order to continue improving the quality of life. This could pose a problem in the future such as the housing bubble that burst in the United States. Increasing China's GDP and investment into their country will help reduce the chance of future housing issues. While this is a sign that future GDP growth and citizen welfare may be in jeopardy. If the Chinese housing bubble bursts there will still be many companies manufacturing and exporting goods. However, many people will not have the money to purchase goods due to unemployment. The government has tried to put in some controls to stem the over heated economy but only time will tell if they succeed in slowing the growth.

Many people in China are still working in the agricultural sector thus; improving investment in agriculture will help poor farmers continue to make money. In addition, many people who work in retail or another sector make a little more than in the agricultural sector are forced to live in a one room house or share a bigger living space with more people. Due to the over inflated housing prices people cannot own or rent a proper house or suite. Controlling house prices and investing in affordable housing will help raise the standard of living.

China is a country that has a very large population that is just starting to become an emerging nation with their powerful economy leading the way. However, many people are still working for low wages which creates an obstacle for government officials as they try to improve their country. China has a competitive advantage over other more developed countries because labour is cheap therefore; other countries such as the United States are outsourcing

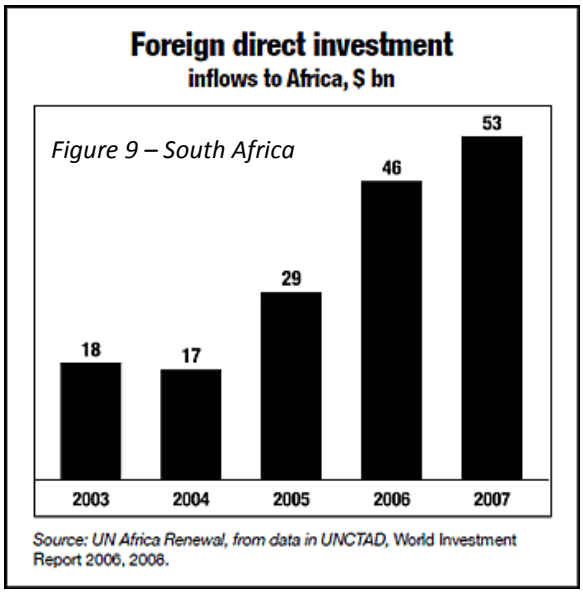
manufacturing jobs to China. Over the last 20 years China has been rapidly expanding their economy providing more jobs for lower class citizens. If China succeeds in stemming it's over active growth by controlling investments and move to an efficient rate that will reduce inflation; China will continue to be a strong economic power throughout the world.

The country of South Africa contributes to 24% of Africa's total gross domestic product and is the leading economic force in Africa. Over the past decade South Africa's efforts to pursue peace, stability, economic growth and top-notch economic policies has triumphed; and as of December 2010, South Africa became one of the top five leading emerging economies in the world. Due to its abundant amount of natural resources, large agricultural sector and top notch economic policies the South African rand is the most actively traded market currency in the world and the best performing currency against the US dollar in both 2002 and 2005.

Since the 2000 election of President Thabo Mbeki, the government of South Africa has changed their economic policies focusing on growth, foreign investment, privatization and cutting unneeded government spending (Hervieu, 2011). Before 2000, South Africa's most significant problems were high unemployment and inequality, both economically and socially. South Africa has been able to diversify its economy by managing substantial: mining, industry, service, agriculture and finance industries. South Africa has been able to establish a comparative advantage in its tertiary economy, which accounts for 60% of South Africa's GDP or 230 billion dollars nominally ("Southafrica.info," 2012). Not only does South Africa produce nearly every essential commodity (except Petroleum), but also they are the largest supplier of gold, platinum, manganese and other industrial minerals. Also, South Africa is the lead producer in minerals that form stainless steel; this has proven to be very beneficial with the increase in demand for automobiles, and as a result, South African steel exports have risen 14%. Not only are their natural resources appealing, but their tourism, construction and live stock development (up 297% at 4 million dollars in 2006) industries/exports are increasing rapidly. South Africa has been able to abolish their old economic system of high tariffs, high government intervention and taxes; making way for a new contemporary economic system. This modern system has lowered taxes, decreased government intervention, eliminated non-resident taxes, reduced secondary taxation on dividends and has essential made foreign and domestic investments equal ("Southafrica.info," 2012). South Africa is now able to foster and maintain International relationships. Foreign

investors that operate various private enterprises now see the same incentives as domestic companies ie) export initiative programs and tax subsidies. As you can see on the left since 2000, privatization has opened up the South African economy: reducing costs, increasing production and increasing foreign investment.

South Africa's financial sector is backed by a strong legal framework and compares favorably with many industrialized countries, in fact South Africa's financial system ranks 18th in the world. Their financial sector is highly regulated with a central bank and a few large banks, backed by an extensive nation wide electronic network. A new initiative has been mandated called the "Overseas Private Investing Corporation" , this program helps overseas investors invest in South Africa by providing risk analysis's and consultations.



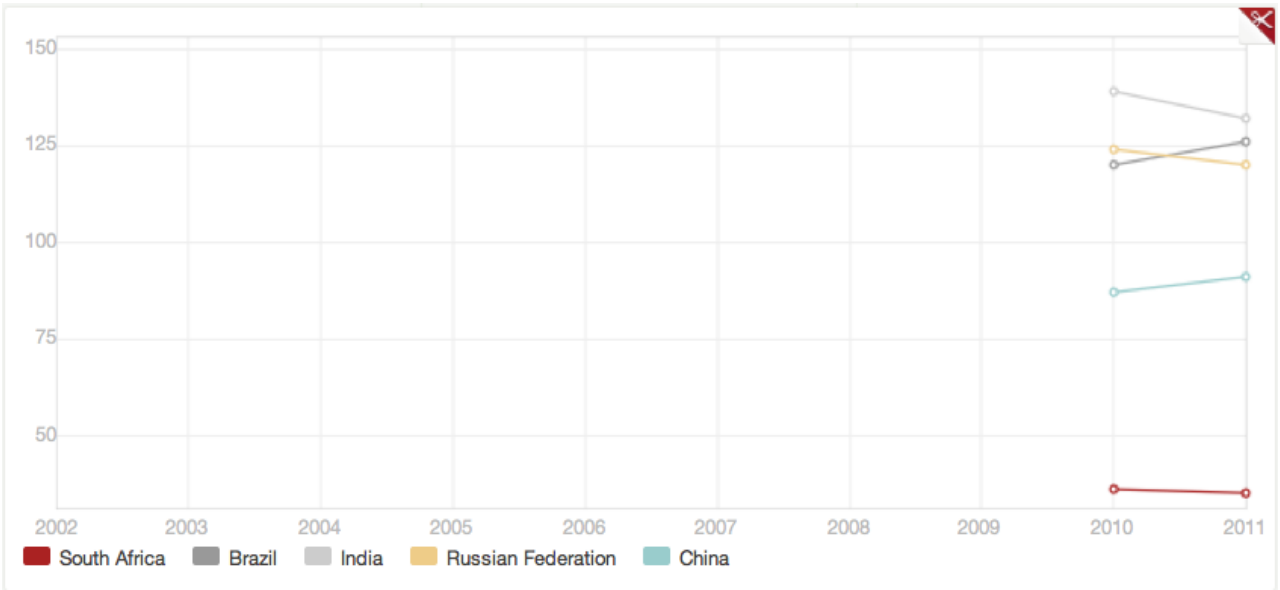


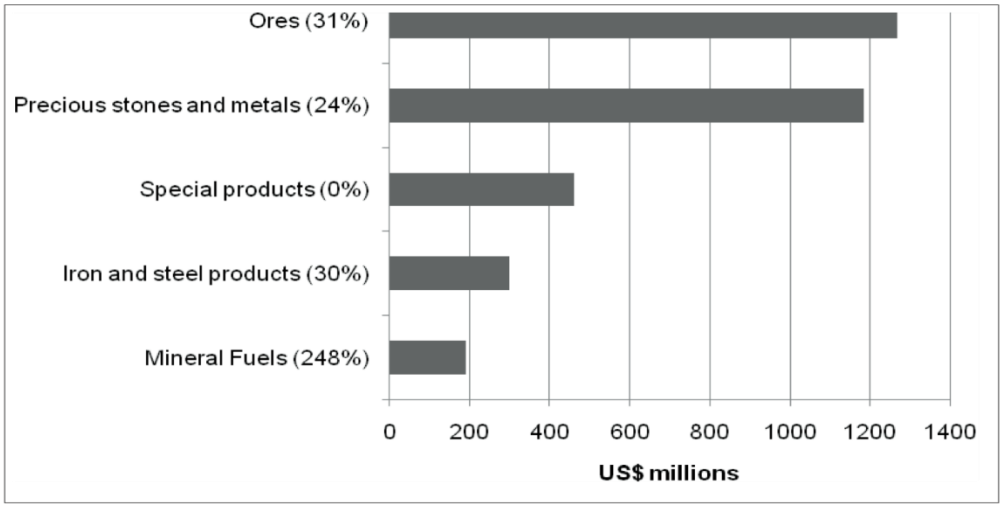
Figure 10- Ease of Doing Business

South Africa (red)- 34th, China (blue)- 87th, Russia (yellow)- 120th, Brazil- (dark grey)-126th

In fact, as of 2011, the World Bank ranked South Africa as the 34th "Easiest Country to do business in" in the world. As you can see in the graph above, South Africa ranked number one compared to the other BRICS countries. As a result of these various initiatives South Africa is seen as an "E Commerce" hub of that hemisphere.

As the government of South Africa's economic policies has become more progressive so have their spending habits. The government is focusing on more long term investment, spending their budget on infrastructure such as: power stations, road networks, dams, water supply pipelines, schools and hospitals. Not only is the government creating more short/long term jobs but also they are paying greater attention to planning and budgeting directly targeting poorer municipalities. An increasing percentage of their budget (20%) is going towards education, fixing up classrooms and improving wages for its teachers. In fact, South Africa has one of the highest rates of public investment in education in the world. South Africa has over a million students, eleven universities and six comprehensive institutions ("Southafrica.info," 2012). With these figures the government has been able to develop strong educational policies, dividing educational standards into two categories: basic education and higher development. Today, the government is working towards abolishing the apartheid legacy that still remains within the education system. Approximately nine million adults in South Africa are completely illiterate, teachers in poorer districts are poorly trained and the pass rate in these regions remains low. Fee free schools; which receive all their funding form the state, are being built throughout South Africa. These schools are specifically targeting poverty stricken areas (making educational attainment equal for *all* citizens) and make up 40% of all schools in South Africa ("Southafrica.info,"2012). The government implicated various Nation Nutrition programs and has planted approximately 2100 school gardens.

The Countries of BRICS are all developing or newly industrialized countries, characterized by the enormous economies and significant influence on the worlds economy; in fact, the five BRICS countries represent almost half of the entire worlds population. . Their entry into the BRICS has exponentially increased their economic growth (South Africa's trade with other BRICS countries accounts for 20% of their foreign trade volume).



Source: World Trade Atlas (2006)

Figure 11- South Africa's top exports to China

As a result, by the end of 2010 trade activity between China and South Africa totaled 25.6 billion USD and South Africa' s exports to China reached 14.8 billion USD (Hong'e, 2011). South Africa's largest exports to China are primary products, which prove to be and many economists are saying that their entry into the BRICS has taken South Africa from the edge of the World's economies to the center and is now the gateway to Africa in its entirety (Hervieu, 2011).

Alliances such as the BRICS have been established throughout the world. The North American Free Trade Agreement (NAFTA) is similar to the BRICS alliance. Many countries are trying to expand their economies by opening their borders and allowing free trade. However, the BRICS are far more powerful than any other alliance due to their sheer size in population and resources. Brazil, Russia and South Africa economically thrive off of extracting their resources. Oil, natural gas, timber, gold and platinum are some of the many resources extracted. These resources are bought by countries such as India and China where the market is enormous and demand is high. Brazil, Russia, India, China and South Africa are still considered developing countries, although they are emerging. Inequality has been reduced over the last decade which has given rise to a new middle class throughout the BRICS. People can now afford to purchase luxurious goods for themselves and still have money to survive. New mega-malls such as the one

being built in Sao Paulo Brazil are becoming the norm as more middle class citizens emerge. These mega malls represent the emerging middle class based on consumerism similar to current developed countries such as the United States. The BRICS governments must maintain stability by implementing social programs such as Bolsa Familia to increase the quality of life and further their economic power. At the current rate of growth, the BRICS will eventually further become major players in foreign affairs as well as foreign investment. For example, China helped finance the bailout of Greece which illustrates how times have changed (Beer et al, 2011). The BRICS will continue to help finance countries such as Greece because they are becoming more influential. Due to their massive economies developed countries are becoming more passive towards the BRICS because they are increasingly becoming more powerful as resources are scarce. Developed countries must acknowledge the BRICS leverage in world trade as they are a very important market in maintaining the flow of global capital and goods.

Appendix

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Figure 2 Bohn, 2011…….... Page 4

Figure 3- GNI per capital in India….. Page 10

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6 Child Labour and Gender Bias in Developing Countries: The Missing Link

Emma Underhill

Introduction

The issue of child labour has received a great deal of attention in both theoretical and empirical research. Child labour is a significant issue with 15.8% of the world's 5-14 year old children economically active in 2004 (IPEC 2006). The incidence of child labour is much higher than this in developing countries. The prevalence and forms of child labour tend to differ significantly by gender. Edmonds (2007), who is an eminent researcher in this area, concludes "bifurcating data by gender seems a reasonable default position" (p.18).

Despite an extensive empirical literature documenting gender differences in child labour, most of the existing theoretical models on child labour treat children as a homogeneous entity (e.g. Basu and Van (1999), Baland and Robinson (2000)). We are aware of just one theoretical model which allows for heterogeneous children (Horowitz and Wang (2004)). In their model, children differ in terms of their ability to acquire human capital.

While economic theories of child labour do not seem to analyze the implications of gender differences, there is a large economic literature which examines the effects of gender biases on children. This literature is primarily focused on studying the effects of gender biases on parental investments in their children's human capital (e.g. Behrman et al (1986), Davies and Zhang (1995)), sex selective abortion and fertility (e.g. Ben-Porath and Welch (1976), Leung (1991), Chamarbagwala and Ranger (2007)), and health and nutritional outcomes of children.

This essay attempts to link the two strands of theoretical literature, namely, the models of child labour and the models of gender bias. In particular, it analyses the implications for the relative work loads of children of different gender in the presence of parental gender bias. There is an extensive empirical literature which suggests that parental gender bias, particularly in favour of male children, is wide-spread in many regions of the world. In this essay, we analyze the effects of parental gender bias on savings, bequests, and child labour. This essay also studies the efficiency aspects of child labour. In addition, the implications for child labour due to other

forms of gender bias, such as differential quality of schools and labour market discrimination, are analysed.

This essay contributes to the literature by explicitly introducing gender bias into child labour theory. This is important since there is a great deal of evidence which suggests that children of different gender have different experiences of child labour. Separating children by gender in our model allows us to analyze the causes and consequences of gender differentials in child labour. Such an analysis is important in order to devise, implement, and effectively target child labour policy.

To analyse the gender differentials in child labour, we extend the model of Baland and Robinson (2000), which is one of the most influential models of child labour. This model is widely used to analyze the effects of savings and bequests on child labour as well as the efficiency of child labour. Baland and Robinson (2000) develop a two-period model in which parents are altruistic. Parents' utility depends not only on their own consumption, but also on the utility enjoyed by their children. In their model, children are identical and parents put identical weights on their children's utilities. Parents choose levels of child labour, bequests and savings to maximise their own utility, where bequests and savings are constrained to be non-negative. In the model, parents face a trade-off between child labour and human capital acquisition for their children. A higher level of child labour in the first period leads to a lower level of human capital (earnings opportunities) in the next period.

We introduce parental gender bias in the Baland and Robinson (2000) model. We assume that each family has two children: one male and one female. Parents are altruistic, but they put more weight on the utility of their male child. The rest of the model is identical to Baland and Robinson (2000), except discounting is introduced and market rates of return are not normalised to one. Similarly to their model, children have identical human capital functions (earnings opportunities). Parents decide the levels of child labour and bequest for each child and their own savings.

We find that the parents choose the same level of child labour for each child, when they can give strictly positive bequest to both. We also find that when both bequests and savings are interior, the levels of child labour are efficient. In the model, the bequest received by the male

child is always greater than or equal to the bequest received by the female child. We find that if the bequests (for one or both children) are at the corner, then the female child works more than the male child. In addition, the child labour allocation is inefficiently high for the child who does not receive bequests. If on the other hand, savings are at the corner, then the child labour allocation is inefficiently high for both children. All these results are new to the literature.

The mechanism for these results is as follows. Parental bias towards their male child implies that parents want to provide him with greater consumption (utility) than the female child. When parents can give each child a bequest, they can provide their male child with higher consumption by giving him a greater bequest. Thus, they choose same level of child labour for both the male and female child, but give more bequests to the male child. However, when bequests (one or both) are at a corner, it is not possible for parents to make all the adjustments through bequests. The male child must work less than the female child in order to ensure that he has greater human capital and consumption in the second period.

Regarding efficiency, when savings are at the corner the marginal utility of parents of first period consumption becomes relatively high compared to the marginal utility of consumption of their children. Thus, parents choose an inefficiently high level of child labour in the first period. Similarly, a child does not receive a bequest, when the marginal utility of consumption of parents in the second period exceeds the marginal utility of consumption of the child in the second period. In this case as well, parents choose an inefficiently high level of child labour.

In this essay, we also analyze the effects of other forms of gender bias such as differential quality of schooling and labour market discrimination. Such gender biases can be captured by differential human capital functions or earnings opportunities. We only analyze the case in which bequests and savings are interior. In a model with no parental bias but in which a male child has superior earnings opportunities, the male child works less than the female child. However, they have equal consumption levels and the male child receives fewer bequests than the female child.

Intuitively, parents would like the male child with better earnings opportunities to work less and study more. However, with no parental gender bias, parents would also like to give the same level of consumption to both children. This they can achieve by giving lower bequests to the male child compared to the female child.

These results are in sharp contrast to our previous model, in which both the male and the female child work at the same level and the male child has a greater bequest and consumption. Our analysis shows that not only the existence of gender bias, but also its form is important for children's outcomes.

Our analysis has several important policy implications. Firstly, we find that a higher public investment in schooling and a greater provision of scholarships for studying reduce the incidence of child labour. A lower interest rate has the similar effect. In the case where child labour is inefficiently high, partial banning of child labour improves welfare. Income transfers to poor families can also reduce the incidence of child labour, particularly for the female child. Finally, affirmative action in favour of women and policies designed to eliminate labour market discriminations can reduce the incidence of child labour for girls.

The remainder of this paper is structured as follows. Section 2 reviews the empirical evidence on child labour across genders. Section 3 surveys the existing empirical and theoretical literature on the implications of gender bias for human capital acquisition, fertility, etc. Section 4 reviews the existing models of child labour. Section 5 presents the basic model and its results. Section 6 analyzes the implications of other forms of gender bias on child labour. We also discuss a model in which human capital accumulation functions (or earnings opportunities) depend not only on time spent studying, but also on capital invested. Section 7 discusses the policy implications of our analysis and Section 8 concludes.

Gender aspects of child labour

The term "child labour" is often used to cover a multitude of situations: from bonded labour to part-time work on the family farm. It is useful to clarify who classifies as a "child" and what activities count as "labour". Neither of these turns out to be simple. Basu (1999) explains that the International Labour Organisation's Convention No. 138 specifies 15 years of age as the age at which a person, under normal circumstances, may participate in economic activities. Most studies therefore define children as individuals of less than 15 years of age. It is presumed that children of less than 5 years are unable to work productively and so statistics often show child labour for 5-14 year olds. However, in some cases individuals under the age of 18 years also

count as children and the ILO sets more specific thresholds for some types of work e.g. light work from the age of 12 years is permissible in a developing country context (IPEC 2006).

The International Labour Organisation (ILO) and in particular the International Programme on the Elimination of Child Labour (IPEC) are the main international bodies for dealing with child labour. Their definitions are used by many researchers. The IPEC (2006) defines "working children" as those engaged in "economic activity" which includes: market production (paid work) and certain types of non-market work (un-paid work) e.g. working in a market-orientated establishment run by a relative. Children working in another household are also considered to be economically active, but children undertaking domestic work in their own household are not included, nor are children who are unemployed and looking for work.

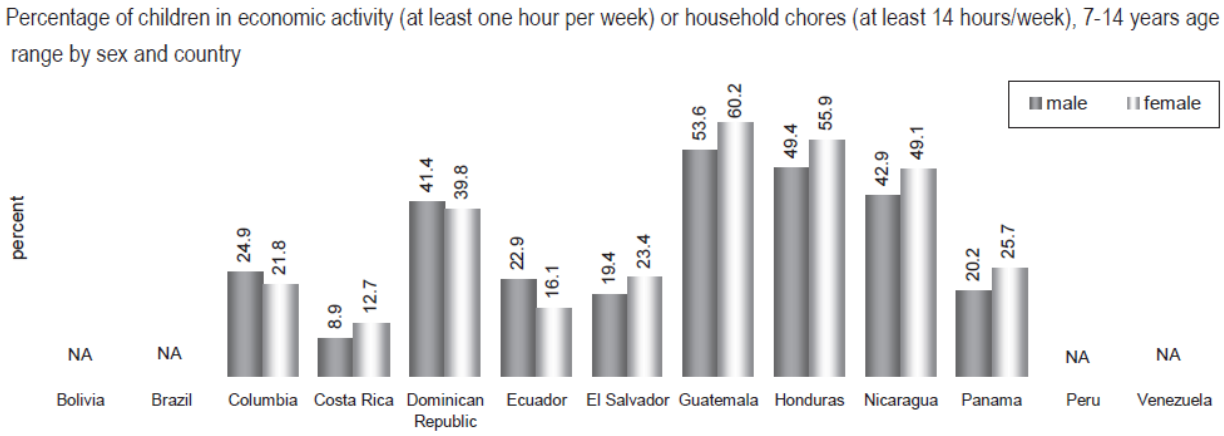
The IPEC distinguishes between working children and child labour. In particular, unlike much of the economic literature, it does not classify all economically active children as child labourers. It defines child labourers as a subgroup of "working children". Child labour is "work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development", (IPEC website). The ambiguity of the term "child labour" poses issues for measurement and assessing its impacts. We use a broader definition of child labour that consists of all time children do not spend in education. This encompasses market and domestic work, since both may adversely affect the time spent on education and result in a loss of earnings capacity.

The presence of working children is by no means trivial with around 190 million children of 5-14 years estimated to be economically active world-wide in 2004 which is 15.8% of the world's population of this age group. 87% of these children are categorised as participating in child labour (IPEC (2006)). In our analysis, we treat all economically active children as child labourers.

Data clearly shows different patterns of child labour between girls and boys in most developing countries. Edmonds (2007) suggests that boys tend to have higher participation rates in market work and girls tend to have higher participation rates in domestic work. Gender differences are often very sensitive to definition since domestic work often goes unaccounted for in child labour classification. If domestic work is included, in some countries girls' labour is likely to outstrip that of boys.

IPEC, UWC (2006) try to capture the total work involvement of boys and girls of age 7-14 years by assessing the percentage that are economically active for at least an hour a week or undertake household chores for at least 14 hours a week. There is no accepted definition of the threshold for household chores, so IPEC, UWC (2006) arbitrarily use 14 hours per week, as this is the threshold often used for light work. Their results are shown in Figure 1. They find that for six of the nine Latin American and Caribbean countries they have data for, girls have higher total participation rates. The exceptions are Columbia, Dominican Republic and Ecuador. In all countries studied the proportion of boys that were economically active exceeded the proportion of girls and the opposite was true of household chores.

Figure 1



Source: IPEC, UWC (2006) p. 18

Edmonds and Pavcnik (2005) find similar evidence using a broader range of countries. Table 1 shows their results based on 5-14 year olds using UNICEF MICS data for 36 countries. They too find higher participation rates for male children in market work, but far higher participation rates for female children in domestic work. When they include both types of work (i.e. market and domestic) the participation rate for girls (72.1%) is higher compared to boys (64.8%). This data shows that the participation rates that include domestic work are considerably greater than those for market work, indicating how important a role domestic work may play. Table 1 also shows that girls are more likely to work longer hours than boys.

A great deal of evidence suggests that the types of work economically active girls and boys are engaged can be quite different even within a sector. For example, in the agricultural sector boys and girls often undertake separate tasks. Edmonds (2007) suggests Bangladeshi girls are

more involved in growing vegetables and poultry where as boys are involved in growing cereal crops. He also finds that boys are more likely to work in construction site preparation and furniture manufacture while girls are more likely to work in textiles and handicrafts. It therefore seems that not only the participation and intensity of work differ across children of different genders, but also the types of work.

Table 1

Participation Rates in Various Activities for 124 Million Children 5–14 from 36 Countries in 2000

	All children	*Age*		*Gender*		*Location*	
	5–14	*5–9*	*10–14*	*Male*	*Female*	*Urban*	*Rural*
Market work (MAR)	25.0	15.3	35.2	26.6	23.3	18.9	30.5
Paid	2.4	1.0	4.0	2.8	2.0	2.2	2.5
Unpaid	5.8	4.4	7.3	5.6	5.9	4.0	7.3
Family	20.8	12.4	29.7	22.4	19.1	14.8	26.2
Domestic work (DOM)	64.6	50.8	79.2	59.3	69.9	60.7	67.4
Any work (MAR + DOM)	68.4	53.5	84.3	64.8	72.1	64.1	71.7
20 or more hours per week	20.7	10.3	31.8	19.4	22.1	14.1	26.4
40 or more hours per week	6.4	2.7	10.3	6.1	6.7	3.6	8.8

Notes: Each cell contains participation rates in indicated activity in the last week. Children may participate in multiple activities. *Paid* refers to children who worked outside of their household for wages in the last week. *Unpaid* refers to children who worked outside of their household in the last week without pay. *Family* refers to children that worked in their family business or farm in the last week. *Market work* indicates that the child participated in paid, unpaid or family work. *Domestic work* indicates that the child participated in household chores in her own household in the last week. *Any work* indicates that the child participated in market work or domestic work in the last week. UNICEF's summary statistics available at ⟨http://www.childinfo.org⟩ report a higher incidence of unpaid work outside of the child's household. The discrepancy may owe to a missed change in coding in the Angolan and Kenyan data and shows up as a slightly higher incidence of working children in UNICEF summary statistics than those presented.

Source: Authors' calculations from UNICEF Multiple Indicator Cluster Survey End of Decade Assessment microdata: ⟨http://www.childinfo.org/MICS2/MICSDataSet.htm⟩. Countries included are Albania, Angola, Azerbaijan, Bolivia, Bosnia and Herzegovina, Burundi, Cameroon, Central African Republic, Chad, Comoros, Cote d'Ivoire, Democratic Republic of Congo, Dominican Republic, Gambia, Guinea Bissau, Guyana, Kenya, Lao People's Democratic Republic, Lesotho, Madagascar, Moldova, Mongolia, Niger, Philippines, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Sudan, Swaziland, Tajikistan, Togo, Trinidad and Tobago, Uzbekistan, Venezuela and Vietnam. Individual country means are weighted to reflect survey design and are weighted by 5–14 population totals in computing cross-country means. Population 5–14 estimates are from ⟨http://esa.un.org/unpp/index.asp?panel=2⟩, medium variant, 2000.

Source: Edmonds and Pavcnik (2005) p. 203

Child gender and its implications for human capital, fertility and welfare

As seen in section 2, children of different gender tend to have different experiences of child labour. It is also the case that, in many countries boys and girls have differential school attendance rates, or in fact attend separate schools. Women may have a different status than men and so may play a lesser role in family decision making. In addition if wages for women are lower or if women leave the family upon marriage there may be lesser incentives to invest in girls. There is also the well noted phenomenon of skewed sex-ratios, possibly owing to sex selective abortion, which shows gender bias in its starkest form. Parents may prefer a male child either because of their own gender preference, or because they observe outside factors that would disadvantage a female child.

The majority of the economic literature on child gender bias focuses on either its relation to human capital investments or fertility, notably not on child labour. We shall focus on the work relating to human capital, as this links more closely with child time allocation decisions.

Behrman et al (1986) outline three conceptually distinct ways that optimising parents may allocate human capital investments in their children unequally across genders. Firstly, parental preferences may favour one gender, in the sense that they value the same outcome more highly for one gender. Secondly, parents may respond to systematic differences by gender in the price of human capital investments. Thirdly, parents might expect gender wage differentials in the labour market. There is considerable evidence for all three types of gender bias.

It is widely believed that in some cultures there is a bias by parents towards their sons. For example, Tarozzi and Mahajan (2007) state "preference for sons over daughters and gender inequality are well-know and widespread realities in India, particularly in the North-West; they are reflected in such phenomena as sex-selective abortion and female disadvantage" (p.442). Davies and Zhang (1995) suggest that "gender bias often appears to be an integral part of religion and culture," (p. 795) and may have connections to Hinduism and Islam.

There is a considerable amount of empirical evidence which indicates that preference in favour of one gender is quite widespread. For example, Koohi-Kamali (2008) finds evidence of gender bias towards boys in Ethiopia. This is based on analysis of budget shares of four adult goods in families with different proportions of girls and boys. Gangadharau and Maitra (2000)

analyse child mortality data for boys and girls in Pakistan and find higher child mortality for girls of age 1-5 years compared to boys of the same age. Davies and Zhang (1995) examine household data for a number of Philippine villages and find evidence of pure sex preference towards boys based on their greater bequests.

As discussed earlier, there may be gender difference in earnings functions. This could come through a number of mechanisms. Firstly, different prices of human capital investments i.e. the opportunity cost of gaining the same level of human capital could differ for boys and girls, especially if they attend separate schools with different levels of access or quality. This could result in different human capital accumulation functions for boys and girls.

Lloyd et al (2005) provide evidence for this phenomenon. They find that there are substantive differences in schooling for boys and girls in Pakistan. Public primary schools are segregated by gender. There is anecdotal evidence that for a long time the government would build one girls school for every two boys schools. This is reflected by a higher proportion of sampled villages with no primary school access for girls than is the case for boys. The type and quality of schools, where available, also differ with girls being more likely to be taught in Urdu and teachers in girls schools being more likely to have less training and have a higher rate of absenteeism.

Differential returns to human capital investment could also come through conditions in the labour market. There is considerable evidence for differential wages across genders in many countries. Behrman et al (1986) state "in many societies female earnings are found to be less than male earnings even after controlling for differences in work experience, hours worked, and human capital investments in schooling," (p. 33). For example, Singh (1996) finds average daily real wages in agriculture for females were lower than those for males in all 16 states studied. Although they find declining average wage differentials over the 1970s and 1980s, the wage differentials were in some cases quite large. For example, female wages were only 64% of male wages in Tamilnadu.

There is also a large theoretical literature which studies the effects of parental preference of one child on human capital, with or without other types of gender bias. The literature suggests that in the presence of parental preference for one child, the parent will value the utility of the

favoured child more than that of any other, i.e. it will hold a greater weight in the parent's utility function. If children gain utility from consumption then the parent will want a greater level of consumption for the favoured child compared to other children. This happens because they need to equate the marginal utilities they receive from giving consumption to each child to optimise their allocation. The greater weight on the favoured child's utility ensures a greater marginal utility for the parent from the favoured child's consumption of an equal amount to another child.

Davies and Zhang (1995) set up a two period model where parents live for one period and can decide the level of investment in each of their children's education and the level of bequest for each child. A parent's utility is a function of their own consumption in the first period, their children's consumption in the second period when they become adults and the number of children of each gender they have. If the son's and daughter's consumption do not enter the parental utility function symmetrically there is said to be pure sex preference. They find that "with pure preference for sons and no differential earnings opportunities for children, parents invest the same human capital in sons and daughters but give more physical capital to sons in the form of bequests," (p.801). This happens because parents equate marginal returns on investment for both children. Since earnings functions are identical, they spend the same amount on education for all children. Given that consumption must be greater for sons, they find it must be the case that sons get a greater bequest.

Davies and Zhang (1995) also analyse the implications of differential earnings opportunities. A child is said to have better earnings opportunities if their average and marginal payoff to human capital investment are greater than for the other child. They examine cases where non-negative bequests bind and where they do not, plus cases where there is pure sex preference or not.

In an unconstrained, no pure sex preference situation, consumption is equal across children. The child with greatest earning opportunities gets more human capital investment and the child with less favourable earnings opportunities receives a greater bequest. Human capital investments in this case are privately efficient and do not depend on wealth. When bequest constrains are binding, the gender with better earnings opportunities consumes more, but receives no bequest and relative human capital investments are ambiguous. Human capital investments can then depend on wealth and the child with better earnings opportunities may

receive less education. When pure preference for boys is introduced, son's relative consumption and bequests tend to rise and their human capital investments will also rise if they were initially inefficiently low. Davies and Zhang (1995) suggest that in societies where bequest constraints do not bind gender differentials in schooling are linked to non-taste factors, but where constraints do bind they can be attributed, in part, to pure sex preference.

These issues of gender bias can also be explored in a bargaining framework. Pasqua (2005) outlines a unitary model, a non-cooperative model and a cooperative model of household decision making to explain lower education for girls compared to boys in developing countries. The latter two move away from the unitary model traditionally used and allow for parents to have different preferences. In the non-cooperative model parents have separate spheres based on traditional gender roles. Each parent chooses their contribution to each child's education given their spouse's contribution. The Nash-Cournot equilibrium is where best response functions are solved simultaneously. In the cooperative model, each parent takes the non-cooperative separate spheres outcome as their threat point and spouses Nash bargain from here. Pasqua (2005) concludes that household investment favours boys since investment in boys is less costly and more productive, due to market factors. Moreover, they suggest traditional women's roles and a parental preference for boys could widen the educational disparity. Clearly, in bargaining frameworks decision making power of the husband and wife could be important if they have different preferences towards their children, for example, wives may favour daughters.

The effect of gender bias on fertility has also been studied widely. In developing countries children are often seen as a means of old age insurance for parents (Ray (1998)). If parents are determined to have a boy survive to support them, then they will need to have more children than they would otherwise have done to have a good chance of any child surviving. The additional children will put extra strain on parental resources. This means there is a greater chance that some of the children will have to work to meet subsistence needs than is the case without gender bias regarding fertility.

While there is a large literature on the implications of gender bias on children, there do not seem to be any studies that link this into a child labour framework.

Theories of child labour

There are a large number of theories of child labour. Basu (1999) and Edmonds (2007) provide a comprehensive summery of these theories. From their analysis it is clear that there are many factors which can influence the occurrence of child labour.

If one takes a simple cost-benefit approach to a parent's decision over their child's time allocation, then assuming a school of the right grade exists and education and work are the two possible uses of a child's time, then the decision can be simply described as follows. Attending school imposes direct costs on the family, for example, transportation costs to get to school and the purchase of educational materials. These direct costs will obviously depend largely upon how close the nearest school is and the infrastructure or transport available. There are also indirect costs of schooling through the child's foregone wage income or use by the family. The indirect costs could depend upon a number of factors. For example they can depend on: the child's ability; the job opportunities available to them in the market; or their use on the family farm which could depend upon land size and crop seasonality amongst other things.

The benefits on the other hand can be seen as the return to schooling. This can differ according to the level of education undertaken; the quality of the school or the teachers; what is taught; and the impact on job opportunities or marriage opportunities as a result. In summary, there are a wide number of factors that are likely to be important. In particular children are more likely to work if there is not a school nearby, or the wage differential for educated compared to less well educated children is low. If the return to schooling is very low then there will be very little incentive to send children to school.

Social norms may underlie many of these factors and so the effects of particular features will differ across countries and even across regions of the same country. In some areas there may be a stigma attached to having children work. Basu (1999) suggests this stigma can reduce the parent's utility when their child works. However, the loss of utility will be smaller if many other children work, since the stigma cost is lower. This, Basu (1999) suggests, can yield the result that if all parents send their child to work then it is worth-while for each parent to send their child to work; and if no one sends their child to work each parent may not find it worth-while to send their child to work, as the stigma cost is so high.

Importantly, there are a number of gender issues which can come into play. Traditional gender roles may, for example, make it more likely that girls will be depended upon for undertaking domestic chores or providing childcare for younger siblings. If there is gender discrimination in the labour market, so earnings for females are lower, then this can have two affects: it reduces the opportunity cost of schooling a girl now, but it also reduces the return to their education. The balance of these effects will depend upon the degree of discrimination in wages for children and adults. Cultural practices over marriage may be significant too. If a girl joins her husband's family upon marriage then her own parents may find little return to their investment in her education.

Many explanations of child labour are based on the prevalence of poverty and suggest that increased incomes may reduce the existence of child labour. Edmonds and Pavcnik (2005) outline four ways improvements in family incomes can potentially affect child labour. Firstly, child labour may be a bad in the family's welfare function, so as incomes improve, parents will choose to have their children work less. Secondly, with diminishing marginal utility of income, the value of the marginal contribution made by the child will fall. Thirdly, higher family incomes may facilitate the purchase of substitutes to child labour e.g. agricultural machinery, which would lower the return to child labour within the household. Fourthly, children's productivity in schooling may increase if increased income allows the purchase of more educational materials.

Children may be sent to work, because their family needs their contribution of income. If parents would prefer their children did not work, but cannot manage this in their economic environment, then credit may greatly affect children's outcomes. This situation could arise for many reasons. A family's permanent income may be too low, so they may have few assets to borrow against. Alternatively, there may be a lack of institutions that allow families to borrow. One situation where access to credit could be particularly useful is when there is a temporary shortfall in income, e.g. due to crop failure or the household head being made unemployed.

Access to credit could have implications beyond an increase in current children being allowed to attend school. Basu (1999) illustrates a dynamic model which has two stable steady state equilibria: one where a poor parent makes their child work full-time, the child gains few skills and so earns little as an adult and also has to send their children to work – a child labour trap; and one where the child goes to school and earns an adequate amount as an adult to be able

to send their child to school – a virtuous cycle. This explanation suggests that action is required to reach the tipping point and then child labour should decline rapidly without further action.

One other important intergenerational effect is that of fertility. Ray (1998) explains many reasons why the number of births chosen by parents can exceed the socially optimum number. In particular the private choice of fertility by parents is likely to be high to ensure children survive until adulthood to support parents in old age. It is possible that the number of births is to some extent endogenous and follows from the actions of previous generations, as with the child labour trap. The large number of children born can stretch a family's resources further and so make it more likely some of the children will need to work.

We shall now focus on a few of the most prominent models of child labour which capture some of these arguments formally and could potentially be extended to consider gender issues. The first of these is Basu and Van (1998) who develop a model with the possibility of multiple equilibria in the labour market and show the implications of this for a ban on child labour. They make two essential assumptions: the luxury axiom, that there is a critical adult wage such that the household will send its children to work only if the prevailing market wage is less than the critical level; and the substitution axiom, that child and adult labour are perfect substitutes after an equivalence correction is made. These are sufficient to give a model with the potential for multiple equilibria. Adults always work and if the wage for adults is below a critical level then children will also work.

They show that there can be more than one stable equilibrium; one where children work and one where they do not. In this case of two equilibria, a total ban can jolt the labour market from the bad equilibrium to the good equilibrium. If the withdrawal of child labour raises adult wages so that they exceed the previous adult wages plus child wages then households will be better off. There can be cases where there is only one equilibrium; that where it is necessary for children to work. This is possible in very poor countries where labour is very unproductive. In this case a total ban can worsen the situation for working households. In either case, Basu and Van (1998) show partial bans are likely to cause a deterioration in labour conditions. They note that the response of boy and girl labour to changes in labour market conditions can be very different, so possible extensions to their model may be worthwhile.

Baland and Robinson (2000) develop a model to consider the efficiency implications of parents' decisions regarding their children's time allocation. They set out a two period model where parents are altruistic towards their identical children and choose levels of child labour, bequests and savings to maximise their parental utility. In the model, bequests and savings are constrained to be non-negative.

They find that if savings and bequests are interior then the utility maximising level of child labour is efficient. However, if bequests or savings are at a corner solution then the level of child labour is inefficiently high. They conclude that "child labour is inefficient when it is used by parents as a substitute for negative bequests (to transfer income from children to parents) or, because of capital market imperfections, as a substitute for borrowing (to transfer income from the future to the present)" (p.678). This model treats children as identical and therefore cannot, at present, pick up the impacts of gender difference.

Horowitz and Wang (2004) extend Baland and Robinson (2000)'s model to allow for specialisation among heterogeneous children. They give each child a "talent" parameter, where a more talented child acquires a larger second period human capital stock for a given investment than a less talented child (where human capital is a function of just education time and talent). They consider bilateral altruism and allow borrowing.

Horowitz and Wang (2004) show that efficiency requires the equalisation of marginal rates of return to education across children. This implies that the more talented child receives more education since, with increasing and concave human capital functions, the more talented child will have a higher rate of return for a given level of investment. This, they argue, could be beneficial for both children by the rationale of comparative advantage in the presence of suitable transfers. However, they find that if bequests are at corner solutions then efficiency does not hold, since if parents are not able to balance second period utilities through bequests, they adopt a second-best strategy of adjusting their children's human capital stocks. They therefore equalise marginal utility returns to education, which creates a more egalitarian distribution of human capital than is efficient. Horowitz and Wang (2004) state that if the more talented child's absolute advantage in human capital accumulation is sufficiently large they may actually receive less education than their less talented sibling i.e. there could be reverse specialisation.

All the above models employ a unitary household structure, in which there is only one decision maker or parents have identical preferences. A number of bargaining models have also been developed to explain household decision making. These can allow for more than one decision maker and different preferences of individuals. As seen in Section 3 bargaining models can involve two parents with different preferences. In the area of child labour there are also models where a parent and a child bargain (intra-household) or a parent bargains with a child's employer (extra-household).

Basu (1999) develops such a model with a parent and a child, based on Moehling (1995)'s collective model. A person's bargaining power here depends on the wage they can earn or how much income they bring into the household. Child labour supply is thus a function of the adult and child wage rates available in the market.

In all the above models, parents are altruistic. Gupta (2000) develops a model in which parents are selfish and do not care about their child's welfare. This is the model's striking difference from the majority of theories of child labour. The parent bargains with the child's employer over the child's wage and the fraction of the wage that is paid in the form of food to the child. The wage component is assumed to be spent by the parent for their own gain. The parent and the employer Nash bargain using the income they would receive if the bargain failed as their threat point. While this model is likely to be applicable for some cases, it is not likely to generalise well, since parents are often shown to care for their children. Bargaining between the employer and parent also wouldn't translate well to the case where children work on their family farm or within their home which are common cases, as shown in Table 1. Even in the child participated in market work, the parent is unlikely to have this much influence on employers in many cases.

To summarise, there are many models of child labour which capture different aspects of the problem, but none of these models analyse gender difference in child labour. To do so, we extend the model of Baland and Robinson (2000), as this captures the parent's decision of child time allocation, bequests and savings and allows for evaluation of the efficiency of the resulting allocation.

The model

The model consists of two periods; $t = 1,2$, one good and a large number of identical families. In the first period there are parents, p, with one male child, m, and one female child, f. Parents live for both periods and in the second period children become adults. In both periods parents supply labour inelastically; providing A efficiency units of labour. In the first parents allocate each of their children's single unit of time between two activities: labour and schooling. l_m and l_f represent the fraction of the child's time allocated to work for the male and female child respectively, with $l_m \in [0,1]$ and $l_f \in [0,1]$. As well as deciding the children's time allocation, parents also decide how much to save, s, in the first period. It is assumed that parents cannot borrow, so $s \geq 0$. This is appropriate for very poor parents who have no collateral or who live in areas where credit markets are weak, both of which could hold in a developing country context.

In the second period parents receive interest on their savings with a gross interest rate of R and can decide how much to give each of their children as a bequest, b_m and b_f for the male and female child respectively. Bequests are required to be a transfer towards children from parents not vice versa so $b_m \geq 0$ and $b_f \geq 0$, i.e. there is one sided altruism. In the second period children are now adults and supply their labour inelastically. The units of efficiency labour an adult possesses, i.e. their human capital, depend on the fraction of their time endowment they worked as a child. In particular a male has human capital of $h(1 - l_m)$ and a female has human capital of $h(1 - l_f)$. h functions are assumed to be the same between males and females and are strictly decreasing and strictly convex in l_m and l_f respectively.

It is assumed that labour markets are competitive and so wages represent marginal products. Production technology is assumed to be linear and male and female child labours are assumed to be perfect substitutes. Linear technology implies constant marginal products, and perfect substitution implies equal wages across genders. We normalise wages to one. Linear technology also implies that partial equilibrium effects are also representative of general equilibrium effects.

Parents' utility depends on their consumption in both periods and the utility enjoyed by their children in the second period. Children derive utility from their own consumption in the second period. Parents have a joint utility function W_p over their consumption in both periods c_p^1 and c_p^2,

and the welfare of their children in the second period, $W_m(c_m)$and $W_f(c_f)$, where W_m and W_f are identical functions. For simplicity, the consumption of children in the first period is not included. Its addition would not alter the first order conditions and main results.

Diverging from Baland and Robinson (2000), parents can place a different weight on each child's welfare δ_m and δ_f. These reflect the level of parental altruism to each child and are such that $1 > \delta_m > 0$ and $1 > \delta_f > 0$. It shall be assumed that $\delta_m > \delta_f$ so there is parental gender bias and parents prefer the male child, as supported by evidence in Section 3. Utilities in the second period are discounted by a discount factor, β, to reflect their present value and W_p is assumed to be separable so that:

$$W_p = U(c_p^1) + \beta[U(c_p^2) + \delta_m W_m(c_m) + \delta_f W_f(c_f)] \qquad (1)$$

where U, W_m and W_f are twice continuously differentiable, strictly increasing and strictly concave.

Parents maximise their inter-temporal joint utility W_p by choosing l_m, l_f, b_m, b_f, and s subject to the following four budget constraints, taking prices (wages and interest rate) as given:

$$c_p^1 = A + l_m + l_f - s \qquad (2)$$

$$c_p^2 = A + Rs - b_m - b_f \qquad (3)$$

$$c_m = b_m + h(1 - l_m) \qquad (4)$$

$$c_f = b_f + h(1 - l_f) \qquad (5)$$

Equation (2) states that parents can consume in period one an amount equal to the sum of labour incomes from their own and their child's work less the amount they choose to save for the next period. (3) indicates that parents can consume in the second period an amount equal to their total income, comprising their own labour income plus their saved income and interest on this, minus the amount they choose to give in bequests to their children. (4)/(5) indicate that the male/female child's second period consumption is equal to their second period total income from their bequest and the return on their second period labour. The return is the amount of human capital they possess since wages are normalised to one.

The eight first order conditions with respect to the choice variables l_m, l_f, b_m, b_f and s are as follows:

$$l_m: \quad U'(c_p^1) = \beta\delta_m W_m'(c_m)h'(1 - l_m) \qquad (6)$$

$$l_f: \quad U'(c_p^1) = \beta\delta_f W_f'(c_f)h'(1 - l_f) \qquad (7)$$

$$b_m: \quad U'(c_p^2) = \delta_m W_m'(c_m) \text{ and } b_m > 0 \qquad (8)$$

$$\text{Or} \quad U'(c_p^2) > \delta_m W_m'(c_m) \text{ and } b_m = 0 \qquad (9)$$

$$b_f: \quad U'(c_p^2) = \delta_f W_f'(c_f) \text{ and } b_f > 0 \qquad (10)$$

$$\text{Or} \quad U'(c_p^2) > \delta_f W_f'(c_f) \text{ and } b_f = 0 \qquad (11)$$

$$s: \quad U'(c_p^1) = \beta R U'(c_p^2) \text{ and } s > 0 \qquad (12)$$

$$\text{Or} \quad U'(c_p^1) > \beta R U'(c_p^2) \text{ and } s = 0 \qquad (13)$$

From this point l_m^*, l_f^*, b_m^*, b_f^* and s^* represent the optimal choice of each respective decision variable.

An interior solution for child labour is assumed by choice of parameters, so marginal benefits and costs to parents are equated, as represented by (6) and (7) for the male and female child respectively. The benefit of an extra unit of a child's labour is the additional utility derived by the parent in that period, given by the left hand side of (6) or (7). The cost to the parents is the reduction in their utility due to the lower human capital of children in the second period. The reduction in parental utility varies by the child's gender due to different weights δ_m and δ_f.

A parent tries to equate their costs and benefits associated with an extra unit of bequest for a particular child. They face costs with the reduction in their own second period consumption, since they have less net income in that period. However, they benefit by the altruism weighted increase in the child's utility from their increased consumption in the second period. If parents are able to equate the marginal costs and benefits for a child's bequest then bequests are interior and they are characterised by equations (8) and (10) for the male and female child respectively.

If however, the marginal costs for a particular child's bequest exceed the marginal benefits to the parent then a corner solution results, with bequest for that child at zero. This is represented by equations (9) and (11) for the male and female child respectively. The bequest for a child is most likely to be at a corner solution when the parents' second period income is low or the altruism weight for that child is low.

The benefit to a parent from an extra unit of saving is the discounted marginal utility from the returns on their savings they obtain in the second period. The cost of this extra unit of saving is the marginal utility they forego through reduced consumption in the first period. If parents can equate the marginal costs and benefits to saving then equation (12) will hold and savings will be positive. If, however, marginal costs to savings exceed the marginal benefits a corner solution will result with savings at zero. It is clear that savings are more likely to be at a corner solution if β is small. That is if parents discount the future heavily.

Analysis of these first order conditions yields interesting results as to the possible differential treatment of children by gender. The condition $\delta_m > \delta_f$ implies that the male child must consume more than the female child, i.e. $c_m > c_f$, if parents' utility is to be maximised. It is clear that $c_m \leq c_f$ is not consistent with parental utility maximisation since the marginal utility for the male child would be at least as great as for the female child $W_m^{'}(c_m) \geq W_f^{'}(c_f)$. Together with $\delta_m > \delta_f$, this implies $\delta_m W_m^{'}(c_m) > \delta_f W_f^{'}(c_f)$. That is that the marginal parental benefit of switching one unit of consumption from the female child to the male child would exceed the marginal parental cost.

Turning to efficiency, the child time allocations are efficient if no one can be made better off without someone else being made worse off. In the model there are three types of agents: parents, children and, implicitly, firms. As will be discussed in Section 7, the level of child labour for child $i = m, f$ is efficient if $h^{'}(1 - l_i^*) = R$. In this case it is not possible to increase one agent's utility without lowering another agent's utility. However, when $h^{'}(1 - l_i^*) > R$ there is the possibility to increase the utility of child i without reducing the welfare of parents and firms. In this case child i's labour is inefficiently high.

The child labour and bequest decisions by parents and the efficiency of these decisions can be analysed by utilising a number of important cases.

Case 1: $b_m^* > 0$, $b_f^* > 0$ and $s^* > 0$

When all choice variables have interior solutions the optimisation is characterised by equations (6), (7), (8), (10) and (12). From equations (8) and (10) it is clear $\delta_m W_m'(c_m) = \delta_f W_f'(c_f)$ which when substituted into (6) and (7) and rearranged yields the result $h'(1 - l_m^*) = h'(1 - l_f^*)$. From this it can be seen that child labour allocations must be equal across genders, $l_m^* = l_f^*$, since h functions are identical. To ensure $c_m > c_f$ it must therefore be the case that $b_m^* > b_f^*$. This is a striking result: parents with gender bias towards their son will have each child work an equal amount, but ensure greater consumption for their son by providing him with a greater bequest when bequests and savings are all interior.

Combining (6), (8) and (12) yields the result $h'(1 - l_m^*) = R$. Thus the level of child labour for the male child is efficient. Since $h'(1 - l_m^*) = h'(1 - l_f^*)$ the same is true for the female child. Therefore, all child time allocation decisions are efficient. These findings are summarized in proposition 1.

Proposition 1: If b_m, b_f and s are all at interior solutions then $l_m^* = l_f^*$, $b_m^* > b_f^*$ and l_m^* and l_f^* are efficient.

Case 2: $b_m^* > 0$, $b_f^* > 0$ and $s^* = 0$

The second possible case is that where bequests are interior but savings are at a corner solution. This is characterised by equations (6), (7), (8), (10) and (13). Following the same method as in the first case equations (6), (7), (8) and (10) can be used to show that $h'(1 - l_m^*) = h'(1 - l_f^*)$ and $l_m^* = l_f^*$. Since it must still be the case that $c_m > c_f$ it is necessary again that $b_m^* > b_f^*$.

Combining (6), (8) and (13) yields the result $h'(1 - l_m^*) > R$. Since $h'(1 - l_m^*) = h'(1 - l_f^*)$ it must be that $h'(1 - l_f^*) > R$ as well. Hence, the levels of male and female child labour are both inefficiently high. Positive bequests to each child, but zero savings does not alter the result from

Case 1; that children of different genders work equal amounts, and the male child receives a greater bequest. However, the lack of savings makes the level of child labour for both children inefficiently high, since the inefficiency result comes straight from (13). The reason for this inefficiency is that the marginal utility of consumption for parents in the first period is high relative to the second period marginal utility of consumption. Parents therefore want to obtain more income in the first period, so their children work an inefficiently great amount. These results are summarized in proposition 2.

Proposition 2: If b_m, b_f are at interior solutions, but s is at a corner solution then $l_m^* = l_f^*, b_m^* > b_f^*$, but l_m^* and l_f^* are inefficiently high.

Case 3: $\boldsymbol{b_m^* = b_f^* = 0}$ and $\boldsymbol{s^* > 0}$

The third possible case is that both children's bequests are zero, but savings are interior. This case is characterised by (6), (7), (9), (11) and (12). Since $c_m > c_f$ must hold and bequests are equal to zero, it must be true that $l_m^* < l_f^*$. This ensures that the male child has higher second period income and consumption.

Combining (6), (8) and (12) yields the result that the male child's level of child labour is inefficiently high, $h'(1 - l_m^*) > R$. Since the level of female labour supply exceeds that of the male child, it must be the case that the female child's labour supply is inefficiently high as well. The reason for inefficiency is that parents value their second period consumption higher than the consumption of their children. These findings are summarized in proposition 3.

Proposition 3: If $b_m^* = b_f^* = 0$ and $s^* > 0$ then $l_m^* < l_f^*$ and both l_m^* and □*□ are inefficiently high.

Case 4: $\boldsymbol{b_m^* > b_f^* = 0}$ and $\boldsymbol{s^* > 0}$

The fourth case is where the male child receives a positive bequest, but the female child does not. With interior savings this corresponds to equations (6), (7), (8), (11) and (12). Combining (6), (7), (8) and (11) yields the result $h'(1 - l_m^*) < h'(1 - l_f^*)$. This implies that $l_m^* < l_f^*$, since h is strictly decreasing and convex in l_m and l_f. This result shows that having a zero bequest for just one child is sufficient to generate the unequal allocations of child labour.

Combining (6), (8) and (12) yields the result that the male child's level of child labour is efficient, $h'(1-l_m^*)=R$. Since, $h'(1-l_m^*)<h'(1-l_f^*)$ and level of male child labour is efficient, it must be that marginal return to human capital accumulation of the female child exceeds the market rate of return. Hence, more human capital accumulation and less child labour is needed for efficiency for the female child. That is the female child's level of child labour is inefficiently high. The reason for this inefficiency is that parents value their second period consumption higher than the consumption of their female child. These results are summarized in proposition 4.

Proposition 4: If $b_m^*>b_f^*=0$ and $s^*>0$ then $l_m^*<l_f^*$ and l_m^* is efficient and l_f^* is inefficiently high.

There are four remaining cases one can conceptualise. However, these do not add to our results significantly. Firstly, if savings and bequests are at corner solutions then it follows that the level of child labour of the female child will exceed that of the male child and child labour will be inefficiently high. Similarly, in the case of zero savings with a positive bequest for the male child and a zero bequest for the female, the same results would occur. The final two cases one can consider involve the bequest for the female child exceeding that for the male child, with either zero of positive savings. Using the first order conditions we can show that in our model, this cannot happen.

Overall, we see that as long as parents can provide each child with a positive bequest it is optimal for parents to have each child work the same fraction of their time, and ensure the greater consumption of the male child in the second period through a greater bequest. If the bequest for at least one child is zero then the female child is expected to work a greater fraction of her time than the male child, given the assumption of preference towards boys. These are striking results.

These results have flavour of some of the findings of Davies and Zhang (1995). They propose that if children have the same earnings opportunities (which we have assumed so far) then parents invest the same human capital in sons and daughters, but give a greater bequest to the son (the preferred gender in their model). There are, however, important differences between our model and that of Davies and Zhang (1995). Firstly, the issue in question is different. Child

labour is at the forefront in our model. Child labour arises, in part, due to poverty. Children are a seen as a potential source of income and their contribution to family income in the first period is very important. This is not captured in models of human capital without child labour. Secondly, in our model parents live for two periods and can save for the second period.

In our model, corner solutions are associated with inefficient levels of child labour. This is also true in Baland and Robinson (2000), who state that inefficient allocations can occur when parents fail to fully internalise the negative effects of child labour. This occurs when bequests are zero or capital markets are imperfect, which implies savings cannot be negative when this would be optimal. This model extends the efficiency results of Baland and Robinson (2000) and shows that the level of child labour for one child may be efficient compared to the market return while the other is not. This can occur if one child has a positive bequest and the other does not.

It is worth noting that the factors that cause gender difference in child labour are different from the factors which cause inefficiency of child labour. In particular, the gender difference comes purely from a lack of bequests whereas inefficiency of child labour is linked to corner solutions for bequests or savings. The model implies that if policy makers are interested in resolving gender differences in child labour, focusing on the bequest to the female child is most sensible. If ensuring efficiency is also a goal then facilitating saving may also play a role. The model also shows that even if child time allocations are equal across genders there may be discrimination, since the female child may receive less bequest and have less consumption (utility).

Discussion

This section discusses how our model links with other relevant theories and how the results compare. It also outlines potential extensions to the model. Firstly, our model assumes parental gender bias, but homogeneous earnings functions across genders i.e. male and female children have the same human capital accumulation functions and earn the same wage per efficiency unit of labour. The gender bias literature (as summarised in section 3) also highlights two other forms of gender bias: differential prices of human capital accumulation and labour market discrimination. Both of these types of gender bias cause differences in earnings functions across

genders. One can use Horowitz and Wang (2004) to analyse the implications of such gender biases.

Secondly, our model uses just the input of education time into human capital accumulation. However, some of the human capital literature on gender bias focuses on physical investments. For example, Davies and Zhang (1995) assume that human capital accumulation depends on the investment of physical capital. One can imagine physical capital investments such as in books and uniforms could indeed be inputs to human capital accumulation. We outline here how the two approaches could be combined into a more general human capital accumulation function.

Differential earnings functions

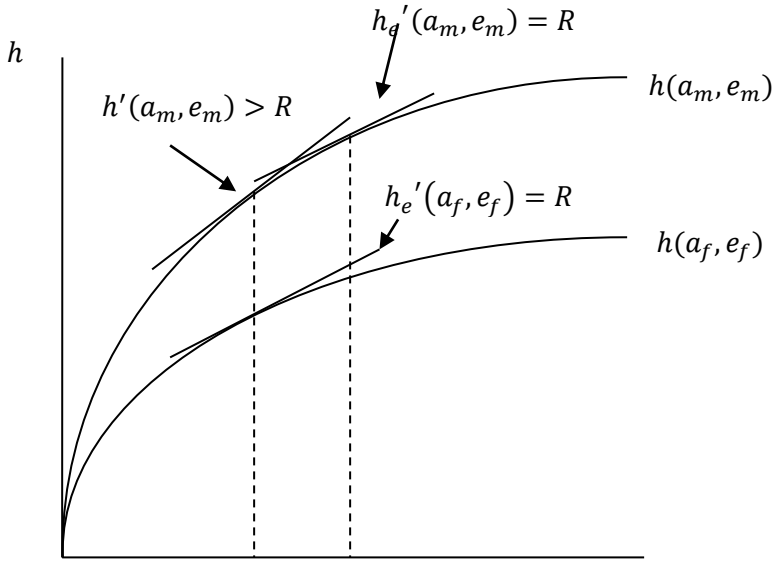
In our model the earnings function for adult $i = m, f$ in the second period is $E_i = w_i h(1 - l_i)$. To this point wages have been identical and normalised to one, so the earnings function has simply been the human capital accumulation function. We shall first consider the possibility of different prices/cost of human capital accumulation. Price/cost differentials could occur when children of different gender attend separate schools. In this case the child who attends the poorer quality school must put in more time to education to achieve the same results, effectively raising the cost of education through foregone income.

This case can be analysed using the model of Horowitz and Wang (2004) now dividing children by gender. The "talent" parameter $a_i,\ i = m, f$ may be interpreted as a measure public investment in schooling for gender i or the quality of their school. Human capital accumulation functions are now denoted $h(a_i, e_i)$ where e_i is education time, which as before is assumed to be time not spent in work i.e. $e_i = 1 - l_i$. h functions are assumed to be the same across children, are increasing in a_i and strictly increasing and strictly concave in e_i.

Efficiency requires $h_e'(a_m, e_m) = h_e'(a_f, e_f) = R$. That is the marginal returns to investment must be equal across possible investments. If one now assumes better schooling for boys, as supported by evidence from Lloyd et al (2005) then $a_m > a_f$. This case is depicted in Figure 2. It is clear that at the same amount of education time for each child, say e_1, the marginal return would be greater for the male child. Say that the marginal return to the female child's education at e_1 is equal to R, then for efficiency to hold the male child must undertake more

education until the point at which his marginal return to education equals that of his sister and the market rate of return. This level is shown at e_2 in Figure 2. If the male child undertakes more education it must be the case that he undertakes less work than his sister. This produces an entirely different result to our model of preference based gender bias.

Figure 2



Comparing results across models for interior solutions when ency holds shows this neatly. In our model with only parental preference for boys, showed that $c_m > c_f$, $l_m = l_f$ and $b_m > b_f$. Boys consumed more as a result of parental preference towards them, but child labour allocations were equal across genders, since parents were able to ensure consumption differentials through adjusting bequests. In the present case with only differences across schools, not parental preferences, the efficient result is $c_m = c_f$, $l_m < l_f$ and $b_m < b_f$. Consumption levels are equal across genders, since parents value utility to each child equally.

If one child had more consumption, and a correspondingly lower marginal utility of consumption, parents would raise their own utility by shifting consumption from the child with more consumption to the other child until marginal utilities across children are equalised. Consumption levels would therefore be equalised. Since boys gain a greater rate of return to any particular level of education than girls, it is optimal for them to work less, so as to increase their education time until marginal rates of return are equalised across genders. To allow equal

consumption given boys gain greater human capital in the first period, it must be the case that female children are given a greater bequest in the second period.

Testing which of these results are present in real life is an empirical matter. There is evidence that our model is appropriate in at least some regions. Davies and Zhang (1995) analyse data from five villages in the Philippines. They find the difference in years of schooling is not significantly different across genders and on average sons received 60% more inheritance than daughters. They conclude this is evidence of fairly strong pure sex preference. It is also strong evidence to support our model.

Difference in earnings functions through labour market discrimination produces identical results to the case presented above. One can assume that human capital accumulation functions are identical and there is no parental gender bias, but $w_m$and w_f are different. This means that children of different gender earn a different wage per efficiency unit of capital. In particular we shall assume $w_m > w_f$ in line with the empirical evidence presented in Section 3. Earnings functions are now $E_i = w_i h(e_i)$ for $i = m, f$. Essentially, this is the same situation as with different prices of human capital accumulation: the male child yields a greater return to any level of education. The results from the previous case therefore apply again and it will be efficient for the male child to work less than the female child, but receive a smaller bequest to ensure equal consumption levels across children.

Parental gender bias and physical capital investment in education

So far human capital accumulation has depended on the child's input of time to education. However, our model could be generalised to include spending on education e.g. on books, as well as investment of time to education. Suppose that the human capital accumulation function depends on physical capital investment k_i and education time $e_i = 1 - l_i$, so $h(k_i, e_i)$. Also suppose that h is strictly increasing and strictly concave in k_i and e_i and that h is homogeneous of degree one, so constant returns to scale exists. The same parental utility function (14) would then be maximised subject to budget constraints (15), (16), (17) and (18) with k_m and k_f becoming additional choice variables.

$$W_p = U(c_p^1) + \beta[U(c_p^2) + \delta_m W_m(c_m) + \delta_f W_f(c_f)] \qquad (14)$$

$$c_p^1 = A + l_m + l_f - k_m - k_f - s \qquad (15)$$

$$c_p^2 = A + Rs - b_m - b_f \qquad (16)$$

$$c_m = b_m + h(k_m, e_m) \qquad (17)$$

$$c_f = b_f + h(k_f, e_f) \qquad (18)$$

Parents can pay for their children's educational inputs in the first period and children will receive higher incomes in the second period based on this investment. It is now possible that children can pay for their own education through child labour which is a useful addition since some authors have suggested some level of child labour may actually help children attend school. Patrinos and Psacharopoulos (1997), for example, question "whether working actually makes it possible for the children to go to school," (p.398). It is possible that working children earn enough to cover incidental expenses such as uniforms and books, which could enable them to stay in school.

One can conjecture that efficiency in this extended model will be characterised by $h_k'(k_m, e_m) = h_k'(k_f, e_f) = R$ and $h_e'(k_m, e_m) = h_e'(k_f, e_f) = R$. That is that the marginal rate of return to physical capital investments will be equal across children and equal to the market rate of return; and that the marginal rate of return to education time will be equal across children and equal to the market rate of return. Obviously, the marginal rates of return on physical capital investments and time investments will also be equal. This suggests that in an interior, efficient case the following should result: $k_m = k_f$, $e_m = e_f$ and therefore $l_m = l_f$. Intuitively, if parents favour the male child then to ensure his greater consumption they would give their children differential bequests rather than different levels of education.

Policy implications

This model provides implications as to how policy can tackle two potential goals: achieving efficiency in the case of inefficiently high child labour; and reducing gender differences in child labour. We shall first consider efficiency.

A marginal ban on child labour could increase efficiency. Baland and Robinson (2000) show that when child labour is inefficiently high a marginal ban on child labour leads to Pareto

improvement. Horowitz and Wang (2004) derive the same result with heterogeneous children. The reason is that a marginal ban does not affect parents' or firms' welfare, but increases child welfare.

Parents equate the marginal costs and benefits of child labour, so a one unit reduction in child labour does not affect them. It would, however, affect the child if their level of child labour was inefficiently high. If inefficiency arose due to bequests being at a corner for child i then $c_i = h(l - l_i)$. A reduction in l_i due to a marginal ban raises the consumption of child i. When bequests are at a corner parents cannot lower bequests to compensate for the reduction in child labour. If inefficiency arose due to savings being at a corner then $c_p^2 = A - b_m - b_f$. There is no longer a link between parents' first period actions and their second period income. Parents will therefore not adjust bequests in the second period in light of the marginal ban in the first period, so child consumption will rise.

Targeted income transfers may also play a role by affecting parental consumption. The source of the inefficiency is important in this case. If inefficiency arises due to bequests at the corner then providing parents a transfer in their old age will be the most effective. This is seen from equation (9) or (11) for the male or female child respectively. The marginal utility loss to parents from their reduced second period consumption exceeds the marginal benefits of providing a bequest, so no bequest is given. Raising parents' second period consumption will reduce their marginal cost of bequest towards the marginal benefit, so changing the outcome towards the efficient level.

On the other hand, if inefficiency arises due to savings at the corner, as characterised by (13), then a transfer to parents in the first period when they have young children would be most useful. (13) shows that the marginal utility of first period consumption for parents is too high for relative to the second period. If the first period consumption could be raised by a transfer then the marginal utility of first period consumption would fall.

Income transfers would need financing. Lump sum taxation would not change the efficient level of child labour, so the transfers described would reduce child labour towards the efficient level. External aid can also be used to finance such income transfers. However, financing transfers through distortionary taxation would alter the first order conditions and change the optimal response of parents. In this case, the efficient level of child labour would change and it is not clear whether child labour would increase or decrease.

The efficient level of child labour for each child could itself be changed by policy. For example, anything that reduces the market rate of return, R, will reduce the efficient level of child labour for each child. This can be seen from the condition for efficiency: $h'(1-l_i^*)=R$ for $i=m,f$. If R falls then $h'(1-l_i^*)$ must also fall to maintain efficiency. This means $e_i=1-l_i^*$ must increase, hence l_i^* must decrease. That is that for the return to education to fall, children must be undertaking more education and working less.

The efficient level of child labour will also vary with changes in the marginal return on human capital. If say the quality of schools improves through public expenditure on education (financed by lump sum taxation or external aid) then the marginal return, $h'(1-l_i^*)$, increases. This means children gain a greater rate of return for each unit of education. For a given level of R children must now undertake more education and less work for an efficient allocation.

In terms of gender difference, our model with parental preference for the male child suggests girls will work more than their brothers if parents do not have enough income to give their daughter a bequest. If the bequest for the male child is positive, but the bequest for the female child is at a corner then the model implies an increase in parental income will reduce female child labour.

Recently the ILO has been focusing a lot on reducing child labour particularly among girls (IPEC (2009)). One way of achieving this goal is to provide a (proportional) scholarship to female children. Such a scholarship would increase the net cost of child labour and so reduce child labour for female children.

In the case that male children having better earnings opportunities, which we considered in Section 6, female children are expected to work more than their brothers in the efficient case. This can be due to either labour market discrimination or a lower price/cost of human capital accumulation for male children. Any measure that reduces the earnings function differential will reduce the difference in child labour across genders. For example, labour market measures or possibly wider measures that improve the importance of women in society could raise the relative wages of women. If the price of human capital accumulation differs by gender, measures to improve the quality of education for girls will be important.

Finally, measures to reduce preference for male children, for example through cultural change and education, would raise the welfare of female children.

Conclusion

The model developed in this essay generalises a theory of child labour to treat children of different gender separately. This is something which has not been done previously despite its benefits in improving understanding of gender differences in child labour. The model assumes parental bias towards one gender which is supported by consumption and child health data for many societies. The model predicts that if bequests are positive, the amount of child labour for each child should be equal. However, if at least one child does not receive a bequest then the less favoured child will work more. These findings could be tested empirically using household level survey data, including information on child work hours and bequest level, for families with a boy and a girl child.

We find that child labour allocations are inefficiently high for a child if their bequest is at a corner or parental savings are at a corner. A partial ban on child labour or income transfers to parents could improve efficiency. The source of inefficiency is important, as it affects the appropriate timing of any transfer. The efficient level of child labour itself can be altered, for example, by increasing public investment in schooling. Gender differences in child labour can also be tackled. In particular, increases in parental income or scholarships for girls are likely to improve the situation for the female child.

We have compared the results of our model to those that would arise in the efficient case with other forms of gender bias. The form of gender bias turns out to have very important implications. The model could be extended to nest other forms of gender bias, so different combinations of gender bias could be considered together, since it is likely different forms could occur at the same time. The model could also take on different forms of human capital accumulation function e.g. including physical capital. Fully solving this extension is left for further work. It should also be possible to further extend the model to include bilateral altruism.

There are a number of complex factors which are linked with gender differences in child labour. Not all of these can be studied from the current model. Family composition, for example, may play an important role. Edmonds (2007) indicates many studies suggest that having an older sister increases a boy or girl's chances of going to school (Parish and Willis (1993), Edmonds

(2006) and Morduch (2000)). Therefore, younger and older girls in the same family may have different experiences of child labour.

A parent's activities or income may impact upon children differently. Basu (1999) cites evidence of an inverted-U relation between adult female wages and child labour, especially for the female child. As a mother's wages start to rise she may find it worthwhile to start work outside the household and the daughter may be taken out of school to cover childcare or domestic responsibilities. As wages rise further, help can be hired. Basu (1999) also notes differential effects of adult female and male wages on their children's outcomes. In a bargaining framework higher incomes for mothers might lead to different allocations across children than that of fathers, since each parent has their own preferences. These nuances provide interesting areas for further research.

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