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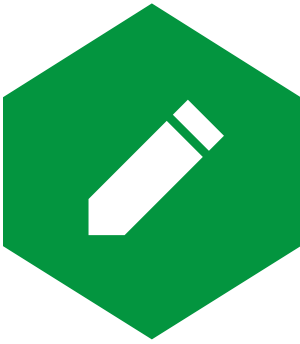
# **Rising Food Prices and Their Implications for Education in Africa**

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# Rising Food Prices and Their Implications for Education in Africa

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*Abstract: Using cross sectional data of Sub-Saharan African countries from 2006-2009, this paper studies the relationship between food crisis, and child education outcomes. Although the study finds a significant and negative direct impact of food crisis on primary completion rates in the region, the same cannot be said for primary enrolment rate, and gender disparities. Even the highest food inflation countries have achieved a slowly progress in primary enrolment in the food crisis period. The results show that children enter schools, but parents may find it so costly to send them, and never complete the primary level. The paper also finds that other factors such as per capita income, student expenditure, and government expenditure can be helpful in explaining the child education outcomes in the region. At the same time, our findings are sobering: In sub-Saharan African countries, international educational goals are unlikely to be reached by 2015, and poor child education outcomes are frequently widespread, in the context of tight government budgets, there is an urgent increase in international financial support needed to help the region to attain quantum and quality of human capital.*

*Keywords: Food Crisis, Child Education Outcomes, Economic Development, Human Capital, Sub-Saharan African Countries, International Educational Goals*

## Introduction

The world was in serious economic and financial turmoil through 2007-2009. In 2007 and into 2008, a compounded mixture of crisis unfolded and hit the world: many countries suffered from dramatic increases in world food prices and high fuel prices through the first half of 2008. There is increasing empirical evidence that education matters for economic growth and development. Recently, the focus has been shifted not only to the importance of education to growth but also on the determinants of educational outcomes.

During an economic crisis, the slowdown of the economy is associated with reductions in hourly wage rate, numbers of hours worked, and the amount of public and private funds available for schools. Such conditions affect children's educational outcomes such as school enrollment, attainment, attendance, and performance.

With all these, one cannot but wonder what actually determine educational outcomes in Africa. This study tries to assess the impact of the food prices rising on education outcomes in Africa. The trend towards rising food prices, as observed since 2007, accelerated significantly in the first half of 2008 and it is nowadays more broad-based than in 2008. The resulting global food crisis posed a serious challenge to the efforts to attain the Millennium Development Goals.

Higher prices of food staples lead to higher levels of undernourishment as poor consumers find themselves unable to purchase the minimum amount of calories, nutrients and proteins required for their day-to-day activities, and reduce their spending on non-food items such as education and health.

The undernourishment caused by the global food price increase increases mortality and susceptibility to diseases and lowers adult productivity. The resulting declines in cognitive development in children, and adults, reduced school and tertiary performance, which undermine human capital development critical for future economic growth.

It is essential to focus on major irreversible factors: if children are severely malnourished, pulled out of school, subject to neglect or violence, and or pushed to workforce, this implies much greater future poverty, probably higher inequality and lower prospects for economic growth (Unicef, 2009, p.1). Vulnerabilities depend on both age and gender, as many girls and

women, youth and adults often experience high levels of nutrition and educational deprivation than boys and men.

Regions dominated by countries that are large net importers of food, such as in the Middle East and North Africa and West Africa, face higher import bills, reduced fiscal space, and greater transmission of world prices to local prices for imported goods such as rice and wheat, as there is high shares of household expenditure on food in these countries (as in many African and Asian countries). Countries with larger net exporters, as in Latin America and Eastern Europe and Central Asia, stand to benefit from higher export revenues and farmer incomes, but with the challenge of ensuring an environmentally sustainable supply response.

These varied effects are due to highly diverse pre-crisis macroeconomic situations, diverse political and governance contexts, as well as diverse policy responses undertaken by governments, as policy should not underestimate the agency of households, including children, in responding to crisis (Unicef, 2009, P.2). The challenge is to support constructive coping mechanisms and seek to discourage damaging ones.

The main focus is to have a better understanding of the global food price increase and its impact on child education outcomes in Africa, as education is at risk, and the international community needs to identify the threat to education posed by the economic crisis and the rise in global food prices, some countries have achieved extraordinary advances. Benin started out in 1999 with one of the world's lowest net enrolment ratios but may now be on track for universal primary education by 2015, the concern is that the increased vulnerability of poor households and rising child malnutrition caused by the food crisis will impede efforts to achieve universal primary education and the wider international development targets set for 2015.

Insufficient attention has been paid to the consequences of this crisis on education outcomes and human capital in the poorest developing countries (Sub-Saharan African Countries), the paper attempts to shed light on the impact of food price spike on education outcomes by examining the effect of this crisis on child's education outcomes in all Sub-Saharan African countries in the period from (2006-2009).

To my knowledge, there hasn't been any research conducted on assessing the impact of food inflation on child education outcomes. This is surprising, because most studies focus on the impact of some other variables as (Education expenditure per capita, Foreign Aid, GDP per capita, and poverty). The contribution of this paper is that, we complement the literature on the determinants of education outcomes by focusing on the estimation of the impact of food inflation on three major educational outcomes (Gross primary completion rates, gross primary enrolments rates, and female to male primary enrolment rates)

For that purpose, a regional cross sectional data put together for econometric testing, using average food price index and average child education outcomes (total primary completion rates, total and the ratio of female to male primary enrolment rates). On the basis of the evidence from these tests, conclusions are drawn on the relative relevance of food crisis for policy –making purposes.

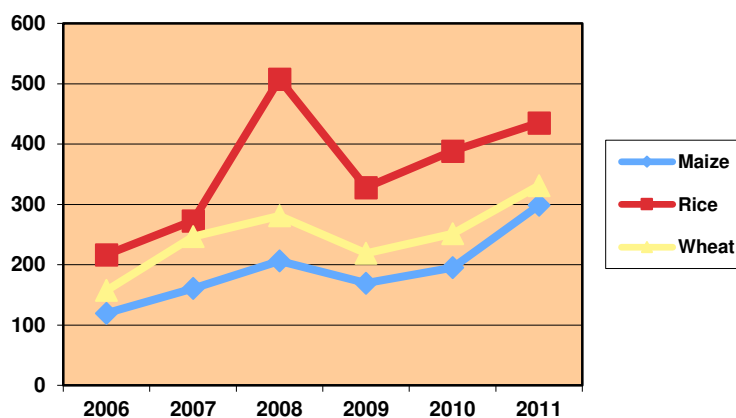
The study proceeds as follows section two introduces the food crisis , its causes and consequences, section three introduces the theoretical framework for explaining the link between the global food price increase, and the domestic food prices, Section 4 shows the food crisis' impact on education performance in the countries under study, section five deals with the estimation of the econometric model used to test the hypotheses of the study, and section six discusses the results of estimation and, finally section 7 gives conclusions and recommendations to policy makers.

## Recent Trends in the Prices of Major Food Grains, Major Causes, and Prospects

Between years 2006 and 2008, the price of wheat increased by 78.35%, and that of rice by 134.31%. The average annual price of rice had shot up to nearly US\$507.65 per tonne compared to a little over \$216 per tonne in 2006, a double increase in less than two years. During the same period, the price of maize increased by 72.3%. These price increases came after a long period of relatively low and stable food grain prices.

At some point in May 2011, the price of rice decreased to nearly US\$435.29 per tonne, while the world market prices of maize increased from US\$ 206.43 per tonne in 2008 to US\$ 298.72 per tonne in 2011, also the price of wheat increased to US\$ 331.31 per tonne in 2011 compared to US\$281.21 in 2008.<sup>1</sup> All major agricultural outlooks(OECD- FAO,USDA, and the World Bank) forecast that at least until 2019 international food prices will remain above the prices in the previous decade, influenced by a complex interplay of different factors.<sup>2</sup>(See figure 1 for the trend in the annual averages prices of rice, wheat and maize for the period (2006-2011).

Figure 1. Annual Average Prices of Selected Food Grains (2006-2011) US\$ per Tonne



Source: Food and Agricultural Organization of the United Nations (FAO): *International Commodity Prices*; <http://www.fao.org/esc/prices>.

These trends have had macroeconomic impacts, affecting budget deficits, trade balances and inflation. They also have multiple pathways for impact on households and food security. But before coming to these impacts, it would be appropriate to look at the causes that were behind the sharp increases in the prices of food grains in 2008.

### Major Causes

It is not possible to untangle all the causes of rising prices. However, it appears from a wide range of recent literature as summarized in figure 2 that the average levels of food prices are driven by fundamentals such as demand factors( population expansion, income growth, and changing diets), supply ( resource use and technology), structural and cyclical factors, trade

<sup>1</sup> Food and Agricultural Organization of the United Nations (FAO). *International Commodity Prices*; <http://www.fao.org/esc/prices>

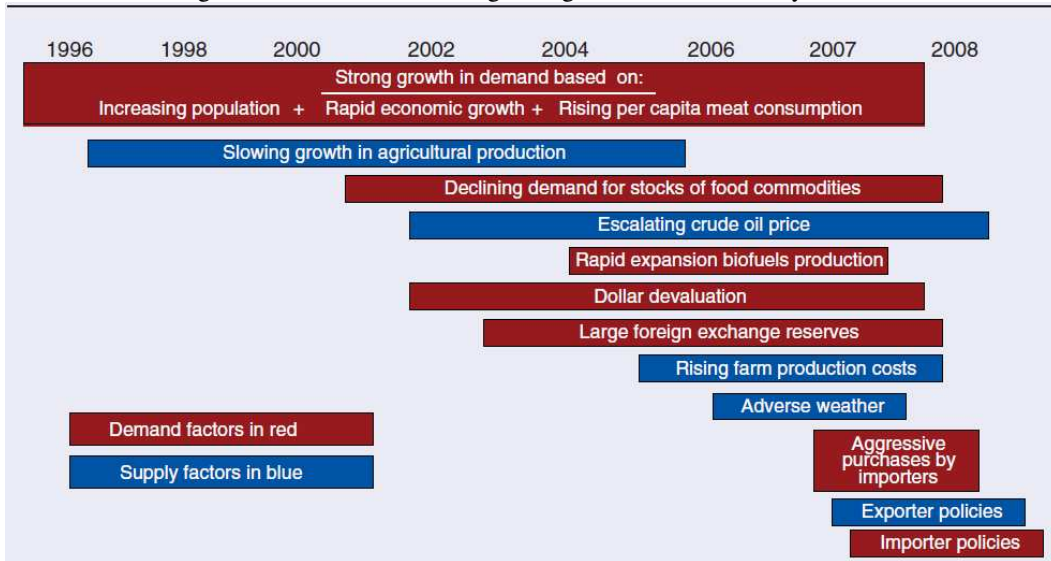
<sup>2</sup> OECD-FAO (2010): *Agricultural Outlook 2010-2019*. Paris and Rome; USDA(2010). *Agricultural Projections to 2019*. Washington, D.C.; World Bank (2010). *Global Commodity Markets: Review and Price Forecasts*. Development Prospects Group, Washington, D.C.

polices, more volatile oil prices, macroeconomic policy, and financial investments. These short term factors becoming more frequent and are likely to continue to amplify food price volatility, especially when global food stocks are low.

In the longer term, though, other drivers may become more significant: climate changes ( such as Flooding), natural disasters, oil depletion, water scarcity, speed of technology development and adoption, as wells as changes in commodity and trade polices related, related to agricultural and biofuels sectors<sup>3</sup>.

A major factor is the increase in the demand for food grains arising from growing world population and an increase in incomes, especially in emerging economies, a rise in income leads to an increase in the demand for meat and dairy products<sup>4</sup>. The latter factor is associated with dietary change toward higher-quality food such as meat and diary products<sup>5</sup>.

Figure 2: Factors Contributing to Higher Food Commodity Prices



Source: Trostle, 2008<sup>6</sup>.

The oil price and energy prices more generally, is a critically important contributing factor to the increase in production costs for agricultural commodities and food , the demand for biofuel production is expected to increase further than in the past three years, which is seen as one of the factors lifting prices to higher average levels in the future<sup>7</sup>. The significant decline in global stocks in early 2000s, contributed to price spikes, and resulted in more countries needed to enter the market as net buyers and to a more food price volatility<sup>8</sup>, as the international food prices are not only higher but also more volatile in recent years.

<sup>3</sup> FAO,IFAD and WFP (2008), High Food Prices: Impact and Recommendations for Actions, A Paper presented for the meeting of the Chief Executives Board for Coordination , Bern, Switzerland, P.2.

<sup>4</sup>Islam,R. and Buckley, G.(2009). Rising Food Prices and their implications for Employment, Decent Work and Poverty Reduction, ILO, P. 3.

<sup>5</sup> Asian Development Bank (2008). Food Prices and Inflation in Developing Asia: Is Poverty Reduction Coming to an End? Special Report, Economics and Research Department, P. 6.

<sup>6</sup>TROSTLE, R (2008). Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices *Outlook Report WRS-0801*. Washington , DC, ERS, USDA.

<sup>7</sup> OECD (2008). Rising Food Prices: Causes and Consequences, P.5.

<sup>8</sup> World Bank (2011).Responding to Global Food Price Volatility and Its Impact on Food Security, Committee Group, Washington, D.C, P.3.

The levels of inflation rates, exchange rates and interest rates are also known to impact agricultural prices, for example, the depreciation of the dollar in recent years has made it cheaper for some countries to import such commodities from the US, thus boosting demand for these imports and changing trade patterns<sup>9</sup>. The investor behavior has also played a role in driving up food prices, as large amounts of money have been flowing into agricultural commodity markets in recent years. Furthermore, food multinationals have also devoted increased financial resources to these same markets, adding to the upward pressure on prices<sup>10</sup>.

The current global grain market situation is similar to 2007-2008 in four respects. First stocks were lower in both periods, driven by lower production. Second, higher oil prices have impacted agricultural commodities in both instances. Third, as in 2008, nominal exchange rates have been quite volatile. Fourth, financial investments in agricultural commodities remain high. Yet, the current situation differs from 2008 in several critical respects. First, recent international price increases are more widespread across agricultural commodities than in 2008. Second, weather is more clearly a major factor this time than in 2008, reducing production and stocks. Third, trade policy responses have further raised the amplitude of the grain price spikes in 2011, but not nearly as much as in 2008 by adding more unpredictable trade distortions<sup>11</sup>.

### Implications on Price Transmission

Diverse impacts were observed across developing countries. Those impacts depend on the extent of dependence on imports; on the extent of substitution possibilities in consumption of food; on availability of food internally, and on the state of the agricultural sector at the time of the crisis; and on economic conditions generally. These factors influenced impacts on the macro economy, on consumers, on farmers and on the poor.

Price transmission is a technical term describing the relationship between domestic and international prices. Imperfect transmission of international prices to domestic prices was highlighted early by Timmer(2008) in his assessment of the impacts of the food crisis in Asia<sup>12</sup>. Several researches have explored the transmission of border prices to domestic prices in Africa to assess the impacts of this crisis (Blein and Longo, 2008; Daviron et al., 2009)<sup>13</sup>. The World Food Program (WFP) estimated price transmission to determine in which countries poor consumers were most vulnerable and to help target their relief efforts. The WFP assessment (2008)<sup>14</sup> based on IMF (2009) data show that there was a considerable variation across countries in the extent of price transmission; prices were transmitted more where countries were less self-sufficient, more dependent on imports, and where domestic alternatives were found.

(Daviron et al., 2009) show that countries who initially kept out high world prices over time would see domestic prices continuing to rise, even as world prices start to fall, he also finds that price transmission may also differ between urban and rural areas as urban areas are much more likely to be integrated with world markets than are rural markets where infrastructure is poor, market information is not well transmitted, and transactions are costly. One way to measure the

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<sup>9</sup> Claire Schaffnit-Chatterjee.2011."Where are food prices heading? Short-term drivers, trends and implications", P.11.

<sup>10</sup> See Fuelling hunger, (2008). Position paper on the food crisis prepared by the International Union of Food, Agricultural, Hotel, Restaurant, Catering, Tobacco and Allied Workers Associations(IUF)

<sup>11</sup>For more details see World Bank, (2011). Responding to Global Food Price Volatility and Its Impact on Food Security. Committee Group, Washington, D.C: 4-6.

<sup>12</sup> Timmer, C. P (2008). Global commodity price rises and impacts on developing Asia. *Asian Development Outlook 2008 Update*. Manila, Asian Development Bank

<sup>13</sup>For more details see : Blein, R. & Longo, R (2009). Food price volatility – how to help smallholder farmers manage risk and uncertainty. *Round Table organized during the Thirty-second session of IFAD's Governing Council*. Rome, IFAD, and Daviron, B., (2009) .Les mecanismes de Transmission de la Hausse des prix Internationaux des Produits Agricoles dans les Pays Africains. Paris, Fondation pour l'Agriculture et la Ruralité dans le Monde (FARM), CIRAD.

<sup>14</sup> World Food Program (2008). Recent Food Price Developments in Most Vulnerable Countries, Issue 1. Rome, World Food Program.



extent of price transmission is to look at food inflation, the extent to which overall food costs went up in response to the increase in world prices; this depends on the share of food in consumption.

Table 1 show that in developing countries food price inflation was generally much higher, and was highest in countries where food was the largest share of the diet, with some exceptions. In the developed countries food inflation had only a small impact on overall inflation rates, with energy prices more important and core inflation rates remaining quite low. Almost all of the developing countries in table 1 experienced higher general inflation rates, and several experienced double digit rates, in these countries food price increases were an important cause behind rising inflation which brings hardship to consumers, and especially to the poor.

The extent of inflation varies, depending on agricultural production, on policy responses, on market integration and on import dependence and openness. Difficult economic conditions and worsening trade balance will likely worsen food availability in countries that had become increasingly import dependent, and will increase costs to combat high border prices for food.

Table 2 show food price inflation, food production growth, and food exports & imports growth for the Sub-Saharan African countries from (2006-2009). Data shown in table 2 suggest some of these inflation outcomes, and their variability. Higher border prices increase import bills and so impact balance of payments, as shown in table 2, the balance of trade worsen in most Sub-Saharan African countries .

In (2006-2009), Namibia for example its food production decreased by 10.6%, its food exports decreased also by 2%, while its food imports increased by 18% , others like Mauritius achieved a very low food production growth (1.4%), while its food exports decreased by 0.4% compared to an increase in food imports by 32%, most other countries which experienced a low or moderate food production growth, had a low food exports growth compared to their food imports growth rate , except cote d' Ivoire and some energy exporters such as Gabon, Cameroon, Nigeria, Congo, and Angola , this leads to a great deal of variability across these countries.

ALI: RISING FOOD PRICES AND THEIR IMPLICATIONS FOR EDUCATION IN AFRICA

Table 1: Food Price Contribution to Consumer Price Inflation from 2006 to 2009, Selected Developing Countries

	Total CPI% Change <sup>1</sup>	Food price Inflation <sup>1</sup>	Expenditure share of food <sup>3</sup>	Food contribution to total change in CPI <sup>4</sup>
<b>Developing</b>				
<i>Asia</i>				
Bangladesh	25.2	29.4	42.2	12.4
China <sup>2</sup>	11	28.4	37.3	10.6
India	20.7	38.7	38.8	15.02
Indonesia	22.4	39.4	33.5	13.2
Iraq	30.6	36	38	13.68
Kazakhstan <sup>2</sup>	29.6	38.6	22.5	8.69
Korea	10.4	15.7	16.2	2.54
Pakistan	47	60.2	34.6	20.8
Philippines	16	23.3	33.7	7.85
Saudi Arabia <sup>2</sup>	14.4	22	23.1	5.08
Thailand	6.8	21	27.6	5.8
Turkey	27.6	37	24.1	8.9
<i>Africa</i>				
Egypt	44.8	62.6	29.1	18.2
Morocco	5.9	10.2	34.3	3.5
Angola <sup>2</sup>	43.6	35.4	47.2	16.7
Benin	11.7	23.3	41.8	9.7
Botswana	30.3	53	32.2	17
Tunisia	12.4	14	26.9	3.77
<i>South America</i>				
Argentina	25.7	22	21.9	4.8
Brazil	14.8	27.7	25.5	7
Chile	15	33	22.9	7.6
Colombia	19.3	26	28	7.3
Peru	10.8	16.6	27.2	4.5
Venezuela	100.6	140	25.7	36
<i>Europe</i>				
Russia	24.4	31.7	22.1	7
Ukraine	63.8	64.5	15.1	9.73

CPI is the Consumer price Index, which is used to measure the consumer price inflation, Percentage change 2006 to 2009.

Percentage change 2006 to 2008 as data for 2009 is not available.

Contribution is column 2x3/100

Data Source: FAO Statistical Yearbook 2010, and USDA: The Economic Research Service (2005 Data) for the expenditure share of food.

Continued: Table 1 Food Price Contribution to Consumer Price Inflation from 2006 to 2009, Selected Developed Countries

	Total CPI% Change <sup>1</sup>	Food price Inflation <sup>1</sup>	Expenditure share of food	Food contribution to total change in CPI <sup>3</sup> %
<b>Developed</b>				
<b>North America</b>				
Canada	4.8	11.5	9.7	1.1
United States Of America	6.7	9.7	5.7	0.5
<b>Europe</b>				
France	4.3	6.8	10.5	0.7
United Kingdom	7.9	20	9.2	1.8
Germany	5.2	9	9.9	0.9
Greece	8.4	10.8	17.8	1.9
Spain				
Switzerland	2.6	3.5	9.3	0.33
Poland	10.5	15	18.2	2.7
Sweden	5.4	12.2	11.4	1.4
<b>Asia</b>				
Japan	0	3	10.5	0.3
<b>Oceania</b>				
Australia	8.7	11	10.5	1.2

1. CPI is the Consumer price Index, which is used to measure the consumer price inflation, Percentage change 2006 to 2009.

2. Percentage change 2006 to 2008 as data for 2009 are not available.

3. Contribution is column 2x3/100

*Source: FAO Statistical Yearbook 2010, and USDA: The Economic Research Service (2005 Data) for the expenditure share of food.*

Table 2: Food Price Inflation, Food Production Percentage Change, and Food Trade Percentage Change for Selected Sub-Saharan African Countries (2006-2009)

	Food price Inflation <sup>1</sup>	Food production Change	Food Trade Change	
			Exports	Imports
%				
<b>Upper Middle Income (UMI)</b>				
Gabon	-4	13.5	52	24
Mauritius	39	1.4	-0.4	32
Namibia	45	-10.6	-2	18
Seychelles	114	-12.3	-13	-14
South Africa	-26	10	16	53
<b>Lower Middle Income (LMI)</b>				
Angola	35.4 <sup>2</sup>	36.4	21.7	54
Cameroon	10.3 <sup>2</sup>	8.7	96	40
Congo, Rep	25	10.6	40	44
Cote d' Ivoire	17 <sup>2</sup>	6.3	59	31
Lesotho	44	10.7	-79	-12
Nigeria	35.6	-14	46	39
Senegal	14	37.6	33	20
Swaziland	40	-1	21	15
<b>Low Income Countries (LIC)</b>				
Benin	23.3	25	29	66
Bukina Faso	24.3	0.5	43	-8.7
Central African Republic	13.4	9.8	-98	42
Chad	14	8.6	4.6	37
Gambia, The	20	20	14.5	-43
Ghana	50	15	38	41
Guinea	66	5.6	-48	12.5
Guinea- Bissau	23 <sup>2</sup>	-5	26.5	59.5
Kenya	50	0.9	17.5	14

Source: The Food and Agriculture Organization Statistics (FAO Stat) database for Production and trade indices.

1. Percentage change 2006 to 2009.

2. Percentage change 2006 to 2008 as data for 2009 are not available.

## Implications on Educational Outcomes

Rising food prices and financial crisis is being transmitted to education systems through various channels. The degree to which countries are integrated to international trade and financial markets, the structure of employment, patterns of import and export, and pre-existing poverty levels all play a part in determining who is affected and for how long.

The past decade has been seen rapid progress towards universal primary education. Some of the world's poorest countries have dramatically increased enrollment, narrowed gender gaps, but millions of children are still out of school and countless millions more start school but drop out before completing primary education. And there is now a real danger that the global economic will stall, and perhaps even reverse, the gains registered over the past decade.

In the context of the food price crisis, and as shown in the previous section that most developing nations especially the Sub-Saharan African countries are reliant on food imports

during 2006- 2009. This suggests that these countries were likely to be especially vulnerable to rising food prices during this period. In this section we will show the impact of this crisis on educational outcomes in these countries. As mentioned earlier, the sharp increase in food prices both in world markets and in local markets since 2006 has raised serious concerns about food and nutrition situation of poor families in many countries particularly in urban areas, where people can not grow their own food, household budgets have been squeezed which will seriously affect educational outcomes of young children, affecting their earning potential in later life.

Slower growth and declining export and import activity have adverse consequences for government revenue and hence public financing in areas ranging from economic infrastructure to health and education<sup>15</sup>.

Several economic studies have theoretically examined the potential effect of an economic crisis on children's educational outcomes (for reviews, see Behrman and Deolalikar, 1991; Mckenzie, 2004; Schady, 2004).<sup>16</sup> According to the existing economic studies, the child educational outcome is exposed to one or more of the following negative effects during the food crisis:

- The reduction in adult income resulted from the food crisis, and higher inflation especially in urban areas makes it difficult for the parents to bear the direct costs of education such as tuition, fees, books, supplies, uniforms, and transportation.
- The reduction in adult income may also force the parents to depend on child labor. This increase in child labor will decrease hours for studying, and the quality of their education as children become physically and emotionally drained.
- Reductions in adult income may force parents to work longer hours, which in turn reduces the time available for them to assist their children in doing their homework, reading, and other educational activities.
- Reductions in adult income may also force teachers to increase their private tutoring, which may affect the quality of education especially in public schools, and increase the cost of education for parents. Furthermore, parents may withdraw their children from schools or even not to send their children to schools.

Sub-Saharan African countries have the lowest primary completion rates of any world region (Bruns et al.2003)<sup>17</sup> as shown in figure 3 in the food crisis period (2006-2009). It is also estimated to have the highest rates of food inflation as shown earlier. We focus mainly on primary school completion rates, given that universal primary school by 2015 is one of the UN Millennium Development Goals, but we also look other indicators as primary enrollment rate and children out of school.

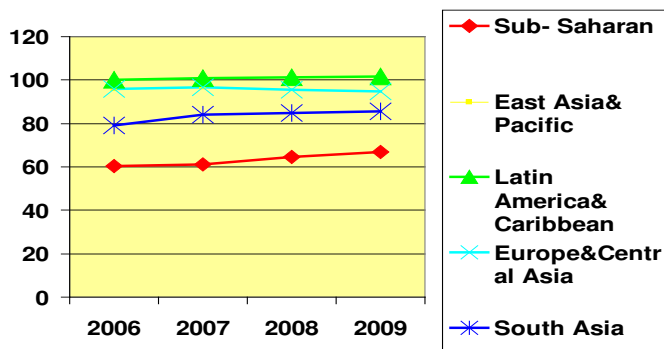
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<sup>15</sup> UNESCO (2010). EFA Global Monitoring Report, P.35.

<sup>17</sup> Najeeb,S.M (2010) .The Effect of an economic crisis on educational outcomes: An economic framework and review of evidence. Current Issues in Comparative Education. Teachers College. Columbia University p.5.

<sup>17</sup> Bruns B, Mingat A, Rakotomalala R.(2003). Achieving Universal Primary Education by 2015: A Chance for Every Child. World Bank, Washington DC.

Figure 3: Primary Completion Rate, Total (% of relevant age group) in (2006-2009)



Sources of data: World Bank Development Indicators

Data for East Asia & Pacific in 2008, and 2009 are not available

Compared with the 1990s, the first decade of the twenty-first century has been one of rapid progress towards universal primary education. Table 3 presents education performance in 2009, the most recent available data for most of the countries compared to year 1999, ranked from high and moderate food inflation rate to low rates. The table explores inequalities in education across sub-Saharan Africa, the poorest continent Using data from UNESCO (2010) and the World Bank Development Indicators (WBDI), we first explore general trends in primary school completion, primary enrollment rate, and children out of school across Africa in 1999 and in 2009 to assess the impact of crisis on educational outcomes and then assess differential progress among boys and girls in these periods. Caution should be taken when interpreting the data provided due to many sophisticated reporting and collection techniques reported that may affect the accuracy of the analysis, and the conclusion drawn. These data presented in table 3 paint an extremely diverse landscape across Africa with respect to primary school completion rates. Compared with 1999, the primary completion rate in 2009 in most countries with a high food inflation rate decreased or increased with low rates regardless the level of national income, except, Guinea, and Ghana (34%, and 19% respectively).

Table 3. Education Performance for High, Moderate, and Low Food Inflation Rates in Selected Sub-Saharan African Countries in 1999, and 2009

Country	Food inflation rate	Primary Completion Rate total			Children out Of school			School Enrollment, Primary Rate total		
		1999	2009	Growth Rate	1999	2009	Growth Rate	1999	2009	Growth Rate
Seychelles(UMC)	114	114	125	11	---	----	-----	112	117	5
Guinea(LIC)	66	29	63	34	698	365.3	-48	56	92	36
Ghana(LIC)	50	68	87	19	1349	791	-41	81	106	25
Kenya(LIC)	50	102	110 <sup>1</sup>	8	1859	1009	-46	90	113	23
Namibia(UMC)	45	95	84	-11	65	52	-20	116	107	-9
Lesotho(LMC)	44	61	68	7	152	105	-31	100	103	3
Swaziland(LMC)	40	60	72	12	54	38	-30	94	111	7
Mauritius(UMC)	39	92	91	-1	12	8	-33	100	99	-1
Nigeria(LMC)	35.6	99	71	-28	8218	8221 <sup>1</sup>	0.04	93	83	-10
Angola (LMC)	35.4	---	45	----	---	----	-----	81 <sup>2</sup>	121	40
Congro, Rep (LMC)	25	37	70	33	---	----	-----	59	11253	
Burkina Faso(LIC)	24.3	22	42	20	1231	983	-20	42	75	33
Benin(LIC)	23.3	---	63	---	586	244 <sup>1</sup>	-58	83	124	41
Guinea Bissau (LIC)	23	29	---	---	114	---	-----	78	126 <sup>3</sup>	48
Gambia (LIC)	20	66	76	10	53	70	33	84	87	3
Cote d'Ivoire (LMC)	17	42	50	8	1290	---	----	74	79	5
Chad(LIC)	14	21	35	14	654	----	-----	64	92	28
Senegal(LMC)	14	44	60	16	740	424	-43	68	87	19
Central African Republic (LIC)	13.4	---	39	---	----	-----	-----	66 <sup>3</sup>	90	24
Cameroon(LMC)	10.3	50	76	26	----	-----	-----	85	117	32
Gabon(UMC)	-4	----	----	----	----	-----	-----	140	---	---
South Africa(UMC)	-26	85	106	21	97	698	619	113	102	-11

Source: UNESCO (2010), EFA Global Monitoring Report, and World Bank Development Indicators.

Data available for 2007.

Data available for 1998.

Data available for 2006.

Data reflect, the actual number of children not enrolled at all, derived from the age-specific enrolment ratios of primary school age children (6 or 7).

(----) Data are not available.

But by looking at table 5, which shows the performance of these education outcomes in the food crisis period, Guinea achieved zero percent growth in the gross primary completion rate, and the 34% increase in the gross primary completion rate was achieved in the period from 1999 till 2005. Primary completion rate increased by moderate and low rates in countries with moderate and low food inflation rates like Congro, Rep (33%), and Burkina Faso (20%), as shown in table 3. Table 5 shows that most of this progress was achieved before the food crisis period (1999-2005), for instance in Congro, Rep, the gross primary completion rate decreased by 8% in the food crisis period. In general table 5 shows also, that the progress achieved in the gross primary completion rate is better in low and moderate food inflation rate countries.

Since 1999, enrollment rates in the region have been increasing five times as fast as during the 1990s; in addition gender gap in primary school has been narrowing<sup>18</sup>. Compared to year 1999 as shown in table 3, in general primary enrollment rates in countries with moderate and low food inflation rates are better than countries with high rates with some exceptions like Guinea, Ghana, Kenya, Gambia, Cote d' Ivoire and South Africa, as parents find it so costly to send their children to schools. Table 5, also shows that most of this progress was achieved before the food crisis period, this is extremely clear in Congo, Rep, which achieved an impressive growth rate in primary enrollment rate as shown in table 3 (53%), but zero % growth rate in the food crisis period , as shown in table 5. Table 5 indicates that, for most of the selected countries in Africa, the progress made in primary school enrolment was better before the food crisis period, as shown in the table, the primary enrolment rate, either decreases or increased with a very low rate or even not changed at all at this period, but its performance in the food crisis period is better than the gross primary completion rate.

Unfortunately millions of children enter school late or not enrolled at all, and never complete a full cycle. As shown in table 3, the out of schools figures refer only to children of primary school age who are not in school. The snapshot for 2009<sup>19</sup>, the latest year for which data are available for the selected countries in the region, points to continued progress, but not fast enough except Nigeria, Gambia, and South Africa. Progress in the region has been uneven. Some countries with large out of school populations in 1999 have made major advances; examples include Kenya, and Ghana. Countries making only limited progress include Burkina Faso, and Namibia.

Table 4 shows that the gender gap is closed slowly or even widening in 2007 ( the Latest year where data are available for the selected countries) in most countries , the table shows also, that the gender gap is narrowing mostly in low and moderate food inflation rates countries. Although variations in average gross primary completion rates can be partially explained by variations in food price index, we can't say the same for the gross primary enrollment rate, even among the highest food inflation countries.

The above analysis shows that the food crisis has an adverse impact on the education outcomes in the region especially the gross primary completion rate; it reduces the progress made by the region in the 1990s, especially for the high food inflation rate countries. Despite encouraging progress, the region is struggling to reach universal primary education. Disparities linked to wealth, gender, ethnicity, language and location are holding back progress in many countries in the region.

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<sup>18</sup> UNESCO (2010), EFA Global Monitoring Report, P.19.

<sup>19</sup> Because of the unavailability of data, the author couldn't assess the performance of the out of school children in the period of food crisis (2006-2009).



Table 4. Gender Gap in Education Performance for High, Moderate, and Low Food Inflation Rates in Selected Sub-Saharan African Countries in 1999, and 2007

Country	Food inflation rate	Primary Completion Rate total		Children out Of school		School Enrollment, Primary Rate total	
		F/M		%F		F/M	
		1999	2007	1999	2007	1999	2007
Seychelles(UMC)	114	1.02	0.94	----	-----	0.99	0.99
Guinea(LIC)	66	0.80	0.93	56	60	0.64	0.85
Ghana(LIC)	50	0.96	1.02	50	48	0.92	0.99
Kenya(LIC)	50	0.97	0.96	49	50	0.97	0.85
Namibia(UMC)	45	1.02	1.03	42	38	1.01	0.99
Lesotho(LMC)	44	1.01	0.94	46	47	1.08	1.02
Swaziland(LMC)	40	0.96	0.96	48	47	0.95	0.93
Mauritius(UMC)	39	1.04	1.02	47	42	1.00	1.00
Nigeria(LMC)	35.6	0.79	0.85	57	55	0.79	0.85
Angola (LMC)	35.4	----	-----	----	-----	----	0.83
Congro, Rep (LMC)	25	1.02	0.97	51	----	0.95	0.81
Burkina Faso(LIC)	24.3	0.72	0.92	54	54	0.70	0.87
Benin(LIC)	23.3	----	0.89	59	71	0.67	0.83
Guinea Bissau (LIC)	23	0.74	----	57	----	0.67	----
Gambia (LIC)	20	0.92	1.10	58	45	0.86	1.07
Cote d'Ivoire (LMC)	17	0.80	0.84	58	----	0.74	0.79
Chad(LIC)	14	0.71	0.75	62	----	0.58	0.70
Senegal(LMC)	14	0.96	1.05	54	50	0.86	1.00
Central African Republic (LIC)	13.4	----	0.76	----	----	----	0.71
Cameroon(LMC)	10.3	0.81	0.88	----	----	0.82	0.86
Gabon(UMC)	-4	----	----	----	----	1.00	----
South Africa(UMC)	-26	0.97	0.93	2	44	0.97	0.97

Source: UNESCO (2010), EFA Global Monitoring Report.

Table 5. Education Performance for High, Moderate, and Low Food Inflation Rates in Selected Sub-Saharan African Countries in 2006, and 2009

Country	Food inflation rate	Primary Completion Rate total			School Enrollment, Primary Rate total		
		2006	2009	Growth Rate	2006	2009	Growth Rate
Seychelles(UMC)	114	---	125	----	----	117	----
Guinea(LIC)	66	63	63	0	87	92	5
Ghana(LIC)	50	71	87	16	95	106	11
Kenya(LIC)	50	--	----	---	105	113	8
Namibia(UMC)	45	82	84	2	108	107	-2
Lesotho(LMC)	44	76	68	-8	111	103	-8
Swaziland(LMC)	40	66	72	6	108	111	3
Mauritius(UMC)	39	92	91	-1	100	99	-1
Nigeria(LMC)	35.6	89	71	-18	103	83	-20
Angola (LMC)	35.4	---	45	----	---	121	----
Congro, Rep (LMC)	25	78	70	-8	112	11	20
Burkina Faso(LIC)	24.3	31	42	11	59	75	16
Benin(LIC)	23.3	---	63	---	106	124	18
Guinea Bissau (LIC)	23	---	---	---	---	----	----
Gambia (LIC)	20	66	76	10	84	87	3
Cote d'Ivoire (LMC)	17	46	50	4	74	79	5
Chad(LIC)	14	32	35	3	78	92	14
Senegal(LMC)	14	51	60	9	83	87	4
Central African Republic (LIC)	13.4	27	39	12	66	90	24
Cameroon(LMC)	10.3	53	76	23	109	117	8
Gabon(UMC)	-4	----	----	----	----	---	---
South Africa(UMC)	-26	---	106	----	104	102	2

Source: World Bank Development Indicators.

Before proceeding to the regression analyses, it is instructive to present the simple scatter plots of the average gross primary completion and enrolments rates performance of all countries in Sub-Saharan African region are presented in figures 4, and 5, respectively.

Figure 4: Scatter Plot of Mean Gross Primary Completion Rate in Sub-Saharan African Countries (2006-2009)

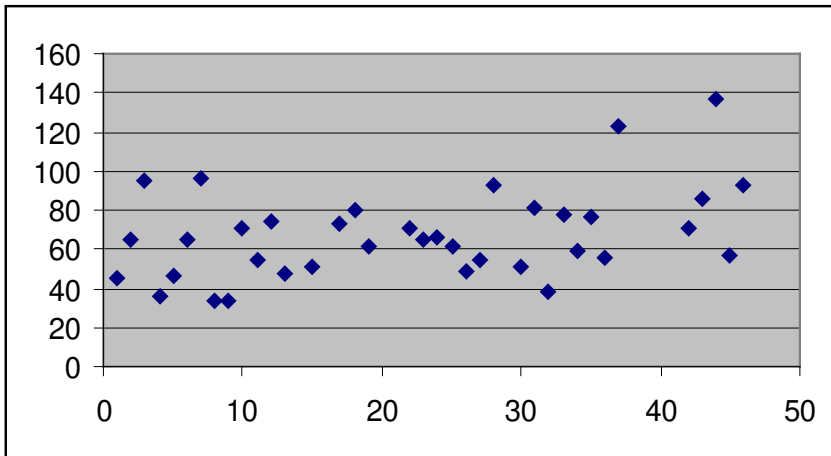


Figure 4 shows that thirty five countries averaged below 100 during the food crisis period, only Seychelles and Togo, where average gross primary completion rate were above 100(165, and 122 respectively).

Almost twenty four countries in the region have an average primary school enrolment rate above 100 in the food crisis period (figure 5), which gives indication that this educational outcome is not affected as the primary completion rate by the food crisis.

With the expectation that the most plausible relationship between the average primary completion rate and average food price index is linear, we generated a least squares linear regression line that best fit the data (see figure 6). Our linear regression finds a negative and significant relationship between the log of mean primary completion rate, and the log of mean food price index. Figure 6 also illustrates the wide diversity in experience across countries.

Although variations in average gross primary completion rates can be partially explained by variations in food price index, the same cannot be said for gross primary enrollment rate, a measure that more closely captures learning outcomes. Even among the highly food inflation rates countries, there is insignificant and positive linear relation between the log of mean gross primary school enrollment rates and log of the mean food price index in the Sub-Saharan African countries as shown in figure 7.

Figure 5: Scatter Plot of Mean Gross Primary Enrolment Rate in Sub-Saharan African Countries in (2006-2009)

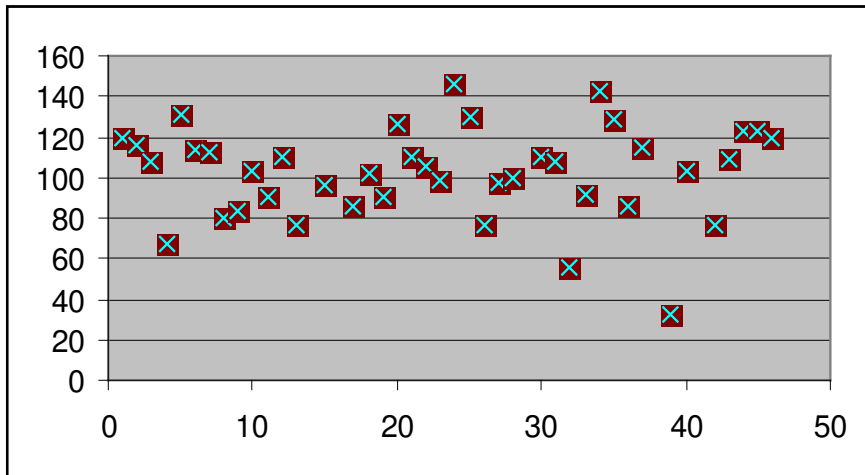


Figure 6: Scatter Plot of the Log of Mean Primary Completion Rate (lgpcr) and the Log of Mean Food Price Index (lfpi) in Sub-Saharan African Countries in (2006-2009)

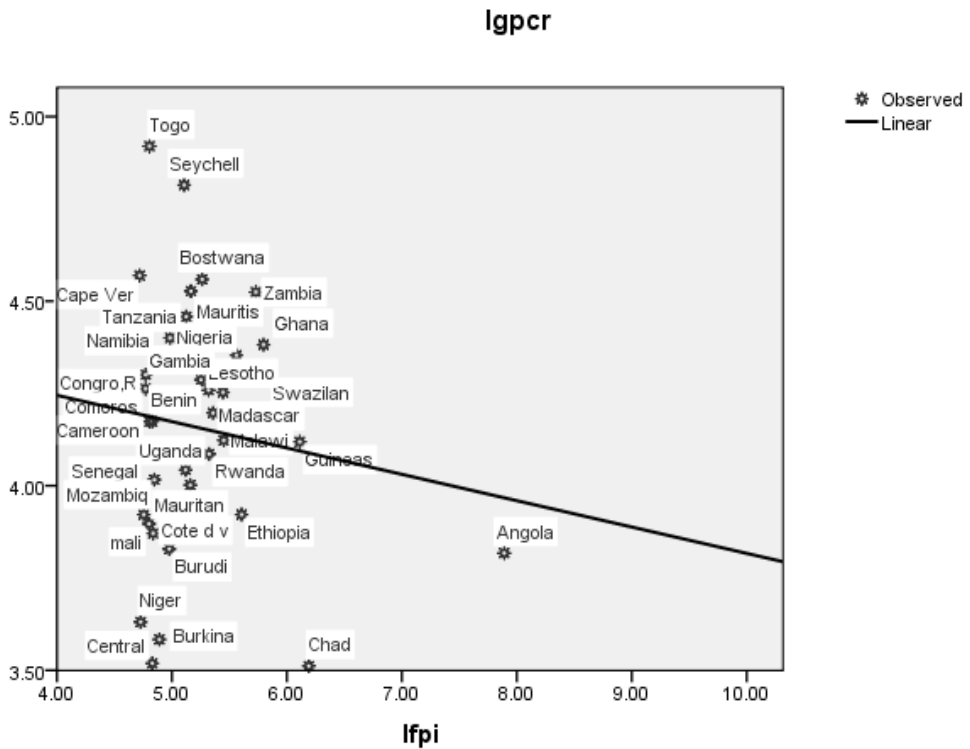
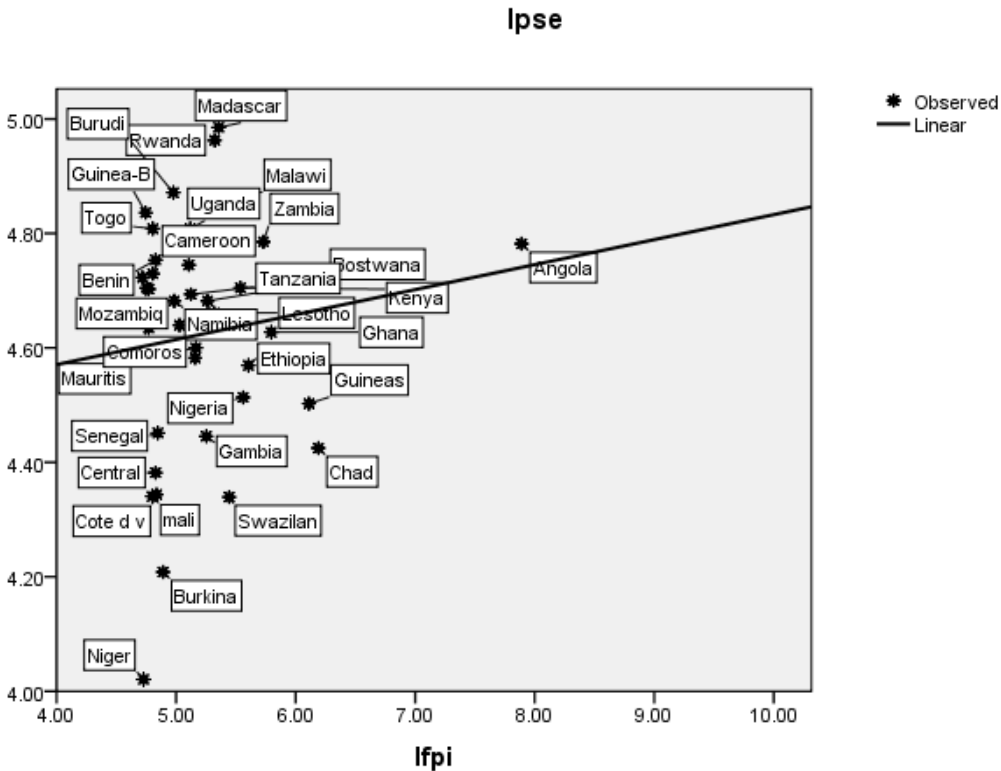


Figure 7: Scatter Plot of the Log of Mean Primary School Enrolment Rate (Ipse) and the Log of Mean Food Price Index (Ifpi) in Sub-Saharan African Countries (2006-2009)



**The Model and Data**

The econometric approach is based on cross sectional data regressions in equations for gross primary completion rates, gross primary enrolment rates, and ratio of female to male enrolment rates. The specification is consistent with the literature and allows for the testing of the following hypothesis.

**Statement of Hypotheses**

The study aims to test the following hypotheses for Sub-Saharan African countries from (2006-2009) in respect to the global price spike and its impact on education outcomes:

1. The global price spike increases the domestic food price which has a significant and negative impact on education outcomes.
2. The food price spike has a more negative and significant impact on female education than male education.

### *Model Specification*

In order to test the hypotheses above, a cross-sectional data will be used for all sub-Saharan African countries for which data are available in the period from (2006-2009), we adopt an ordinary least squares (OLS) model. The model is also used to test the impact of other determinants of education outcomes, such as the percentage of government expenditure on education to GDP, per capita income, primary student expenditure, life expectancy, and urban population on educational outcomes.

Government expenditure on education as an indicator of the volume of resources flowing in to education is expected to have positive effect on primary completion rates, and education enrolment (Anyanwu, J.C, and Erhjakpor, A, O .2007)<sup>20</sup>, the other variables such as per capita income, urbanization, also turn out to be statistically significant in cross- country regressions. Others like Mc Mahon (1999) find a negative and significant relationship between per pupil expenditures and the primary gross enrolment rate, and a positive and significant impact of total education expenditure as a proportion of GNP.<sup>21</sup>We also expect to find a positive and significant impact of urban population and life expectancy on educational outcomes.

The model is stated as follows for the equations;

$$\text{EduOut} = F(\text{FPI}, \text{PC}, \text{UP}, \text{GEXP}, \text{SE}, \text{LE})$$

$$\text{Log EduOut} = a_0 + a_1 \log \text{FPI} + a_2 \log \text{PC} + a_3 \log \text{UP} + a_4 \log \text{GEXP} + a_5 \log \text{SE} + a_6 \log \text{LE} + \mu$$

Where: EduOut= Child Educational outcomes (Gross primary completion rates, gross primary enrolment rates, and ratio of female to male primary enrollment rates).

FPI= Food price Index;

PC= Per capita Income;

UP= Urban population as a measure of urbanization;

GEXP= Government spending on education as % GDP;

SE = Student expenditure in primary schooling as a % of GDP;

LE= Life Expectancy;

$\mu$  = Residual

The study will depend on World Bank Indicators for all the variables, and the Food and agriculture Organization (FAO) for the food price index variable. All Variables are listed as averages in the food crisis period (2006-2009).

### **Empirical Results**

The results for child education outcomes equations are presented in table 6 (gross completion primary rates, gross primary enrolment rates, and female to male ratio for primary enrolment rates. We omit some explanatory variables in estimating the regression results for gross primary

<sup>20</sup>Anyanwu, J.C, and Erhjakpor, A, O (2007). Education Expenditures and School Enrolment in Africa: Illustrations from Nigeria and Other SANE Countries, Economic Research Working Paper, No 92, African Development Bank.

<sup>21</sup> McMahan W(1999). Education and Development: measuring the social benefits, Oxford: Oxford University Press.

completion rates to avoid the multicorrelation problem in estimation. In most cases the coefficients are statistically significant, and all equations have a good fit.

In only gross primary completion rates equation, the food crisis is statistically significant at 10 %. A 10 % increase in food price index decreases the gross primary completion rates by 18.6% in Sub-Saharan African countries. While those for primary enrolment rates (gross, and female to male ratio), we couldn't find any significant impact for the food crisis, as children enter schools but never complete a full cycle.

For the other explanatory variables, for example government expenditure has a significant and positive impact on primary enrolment rates (gross, and female to male ratio). Student expenditure in primary schooling matters for gross primary enrolment rates; it is negatively correlated with gross primary enrolment rates. The study couldn't find any significant relationship between urban population and child education outcomes. Per capita income matters for gross primary completion rates. For example a 10 % increase in per capita income will increase the gross primary completion rates by 17.5% in Sub-Saharan African countries. Life expectancy has a some what strong positive and significant impact on primary enrolment rates (gross, and female to male ratio).

The regression results matches with the theoretical part in presented in section4, as specified earlier. Although variations in average gross primary completion rates can be partially explained by variations in food price index, the same cannot be said for gross primary enrollment rate, even among the highest food inflation countries.

Table 6: Regression Results for Child Education Outcomes

Variables	Model (1)	Model (2)	Model (3)
Constant	4.208*** (5.636)	2.321 (1.460)	2.478*** (3.327)
Government Spending as % Of GDP		0.225** (2.129)	0.114** (2.302)
Food price Index	-1.86* (-1.803)	0.002 (2.129)	0.014 (0.476)
Student Expenditure in primary schooling	-0.103 (-1.083)	-0.269** (-2.708)	0.020 (0.420)
Urban population		0.046 (1.310)	0.019 (1.144)
Life Expectancy		0.543* (1.732)	0.356** (2.426)
Per Capita Income	1.75** (-1.083)	-0.28 (-0.562)	0.009 (0.374)
R- square	53.7	64.6	70
F- Statistics	3.245**	2.274**	3.051**
No of Observations	40	44	44

**Notes:**

- Model (1), for estimating the regression results for gross primary completion rates, Model (2), for estimating the regression results for gross primary enrolment rates, and Model (3), for estimating the regression results for female to male primary enrolment rates.
- T- Statistics are reported in brackets, \*\* denotes significance at the 5%, and \*denotes significance at 10%.

## Conclusions and Policy Implications

This paper tries to identify and assess the threat to child education posed by the rise in global food prices, as with malnutrition, and poverty rising, many poor households have to cut back on education spending or withdraw their children from school. As little empirical evidence exists on the impact of food crisis on child education outcomes especially in the least developed countries like Sub-Saharan African countries, the poorest region in the world faces a potential challenge. The Overall progress towards universal primary education in the past decade has been encouraging. Since 1999, enrolment rates in sub-Saharan African countries have been increasing five times as fast as 1990s. In the food crisis period, the study shows that such progress was slowed down or even decreased for the gross primary completion rates. In addition, gender disparities in primary school have been narrowing so slowly in the food price crisis, and many children were out of school in the region.

Indeed, the model presented and estimated in this paper add upon previous studies in this filed. The results show that the food crisis is considered to be a significant threat to primary completion rates in the region, although the empirical part of this study fails to find a significant



impact of such crisis on enrolment rates or gender disparities in primary school enrolment, but the theoretical part of the study shows that the progress made in primary school enrolment was slowed a lot in the food crisis period, also the gender disparities were slowly narrowed in this period.

Although the study finds a strong impact of government spending on education outcomes in the region, but government resources alone may not be sufficient in preventing the food crisis

From a policy perspective, and in context of tight government budget of the countries in the region, foreign aid appears more effective in achieving the universal primary education by 2015 and an increased financial support through bilateral aid, from international organizations are required, to help the region to move faster towards The Millennium Development Goals (MDGs).

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