THE DETERMINATION OF THE PRESENCE OF PROVINCIAL CONSUMER PRICE INDEX CONVERGENCE AMONG BOTTOM 30% INCOME HOUSEHOLDS IN THE PHILIPPINES

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ABSTRACT

This research paper determines the occurrence of stochastic and dynamic convergence for two series, (1) All Items Consumer Price Index (CPI) and (2) Food components CPI, in 77 provinces and 11 highly urbanized cities, excluding the area of National Capital Region (NCR) among bottom 30% income households in the Philippines using the panel data from 2005 to 2011. The Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) panel unit root tests are used to determine the stochastic convergence, or long-run convergence, of the provincial prices to the national price. On the other hand, dynamic convergence, which reveals short-run behavior of the provinces, is ascertained by the time-varying parameter (TVP) model estimated using Kalman filter. It was found out that the provinces and cities converge in the long run to the national average CPI for All Items and CPI for Food components among low-income household groups. That is, provinces and cities with lower and higher prices for All Items and Food components will soon be converging to the national All Items and Food average prices. Also, based on dynamic convergence test for prices of All Items, 49 provinces and cities were found to experience relatively lower prices compared to other provinces and cities, and for food prices alone, 48 of them were found to have lower food prices compared to national average food price. The rest have prices that are converging towards the national average prices for All Items and Food components.

Key words: Stochastic Convergence, Dynamic Convergence, Bottom 30%, Consumer Price Index, Kalman Filter, Time-Varying Parameter (TVP) model

INTRODUCTION

In 31-year span, the Philippines has attained its peak annual Gross Domestic Product (GDP) growth of 7.3 percent in 2007, outpacing Thailand, Malaysia and Indonesia since 1998 and in more present years, it has sustained with the growth in Asia; yet, it seemed to have achieved minimal marginal improvements in the eradication of poverty (Fujii, 2011).This entails a contradiction that poverty reduction might look as if it is independent of economic progress. Besley and Burgess (2003) offset this contradiction via suggesting a method on estimating the growth elasticity of poverty. And according to the study of Tomoki Fujii (2011), the growth poverty elasticity in the Philippines is lesser than that of Thailand, Indonesia and world average, which signifies that poverty reduction has little sensitivity to economic development. This implies that the poor remained unaffected by the economic advancements (Fujii, 2011) and further indicates that high GDP does not necessarily reflect poverty reduction. Thus, to assess if there really is poverty reduction, it is not enough to just base on GDP per se of a country.

Some studies point out that to be able to address the problem of poverty, there is a need to look into food prices. One of which is a study that was released by Asian Development Bank (ADB) on Philippine Daily Inquirer in May 2008 which had a result that increases in food prices have vast influences in thrusting Filipinos into poverty. Another study by ADB yielded similar conclusion, that about 2.3 million Filipinos tumble into poverty for every 10 percent rise in food prices and that inflation has more effect to the poor Filipinos than the affluent ones (Dumlao, 2008).

Because of the dissimilarity of the effect of inflation caused by high prices of foods, the National Statistical Coordination Board (NSCB) has set criteria in terms of income measures to classify a household whether it belongs in the upper 70% or lower 30% income group. This classification standard was utilized by the National Statistics Office (NSO) to study the Consumer Price Index (CPI) of income households belonging in the bottom 30% group which will give a more suitable inflator of food prices and other basic commodities, and deflator of income which can be applied by the government in making programs to further the quality of living of families in the low-income group and due to the reason that their food item expenditures credit for a more significant proportion compared to their other item expenditures;

thus, food price changes would probably greatly influence those who are belonging in the bottom 30% group (Sta. Ana and Varona, 2011).

This paper, which follows the methodology used by Santos, Poblador & Atienza in their study of *Stochastic and Dynamic Convergence of Provincial Food Prices* and another paper by Mapa, Sandoval and Yap which investigated the *Regional Economic Growth in the Philippines*, assessed for the presence of stochastic convergence through Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) panel unit root tests. Dynamic convergence is also examined to determine the short-run convergence of each province and city in the study and is measured using time-varying parameter (TVP) model estimated using the Kalman Filter. It also conveys the amount and direction of provincial and cities' convergence into a specific path.

Moreover, this study intends to ascertain three objectives: (1) to determine if the provincial and cities' food prices indexed by food and all items components of the monthly CPI defined over the time period 2005 to 2011 would converge to a certain inflation rate path; that is, the prices of foods and all items should not vary substantially on the basis of geographic areas, (2) to determine which provinces and cities converge to and diverge from the national Food and All Items components of CPI and; (3) to provide conclusions that will serve as a central basis for the government in making and implementing viable economic policies for the bottom 30% income group in provinces and cities that are experiencing high inflation rate.

DATA DESCRIPTION

The Economic Indices and Indicators Division (EIID) of NSO supplied the panel data of the CPI of bottom 30% income households in the 77 provinces and 11 highly urbanized cities of the Philippines: Bacolod City, Baguio City, Cagayan de Oro City, Cebu City, Cotabato City, Davao City, General Santos City, Iloilo City, Marawi City, Olongapo City and Zamboanga City (COA, 2007), excluding the area of National Capital Region (NCR), Compostela Valley and Zamboanga Sibugay, from January 2005 to December 2011, with 2000 as the base year.

It was defined by the NSO that CPI is the measure of changes in the average retail prices of a market basket commonly purchased by an average Filipino household (Sta. Ana and Varona, 2011). However, this paper focuses only on the Food (further subdivided into cereals, rice, corn, cereal preparations, dairy products, eggs, fish, fruits and vegetables, meat and other

miscellaneous foods) and All Items components of the CPI. It should be noted that in this paper, two series are actually under study, first is the All Items components of CPI and second is the Food components of CPI for the lower income group. The data on CPI will be used to compute for the monthly inflation rate which indicates the rate of increase in the level of food and all items prices from one month to the next.

The information on CPI of bottom 30% is based on the "relative poverty" concept wherein a household whose per capita income falls below the bottom 30% of the cumulative per capita distribution belongs to the low-income group (Sta. Ana, 2011). In line with this, a separate market basket for upper 70% and bottom 30% income households were made based on the results of 2007-2008 Commodity and Outlet Survey (COS) for each province and selected cities. A separate CPI is provided for the bottom 30% group to closely examine the movement of CPI among families belonging in the low-income bracket who are the most exposed to and most challenged in terms of coping with economic and social difficulties.

DESCRIPTIVE ANALYSIS OF THE DATA

Food CPI measures the changes in the price level of cereal and cereal preparations, dairy products, eggs, fish, fruits and vegetables, meat and miscellaneous foods. CPI for All items covers all that is under Food, Beverages and Tobacco, clothing, housing and repairs, fuel, light and water, services and miscellaneous. Analysis of CPI for All items gives a general look on the price behavior of all commodities and services. Food CPI is also of interest since it was found out from previous studies that most of the expenditures among low-income households are spent on food items than any other items. The importance that this income group gives on food, in consequence, could only mean that they are most vulnerable to food price changes.

From the data, the overall monthly inflation rate for All Item components during the period in review is 0.49% while the overall monthly inflation rate for Food components is 0.54%. That is, the monthly price for All Item and Food components encompassing the CPI market basket for the 77 provinces and 11 highly urbanized cities is estimated to have an average monthly change of 0.49% and 0.54%, respectively, during the period 2005 to 2011.

Figure 1 shows a large increase in inflation rate both for CPI for All Items and Food CPI during the first six months of year 2008 and it dropped drastically on the latter part of the year.

High inflation rate in 2008 is the result of global economic downturn, expanding by around 4.4% (Almanack). Small fluctuations in the inflation rate can be observed in the preceding and successive years of 2008. The two series behave in a similar fashion which is just expected since in the computation of CPI for All Items for the bottom 30%, food components are given larger weights compared to other commodity groups.

Figure 1. Monthly National Inflation Rate for All Items and Food components from 2005 to 2011

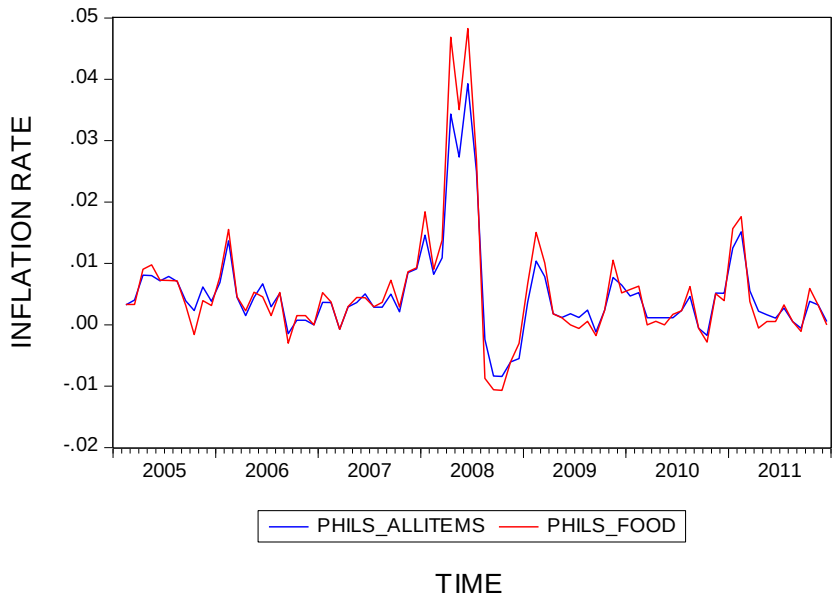


Table 1 and Table 2 presented on the next page show the provinces and cities with the highest and lowest monthly average CPI for All Items and Food CPI. Marawi City, one of the highly urbanized cities, has the highest monthly average CPI for All Items with 185.23, followed by the province of Tawi-tawi with 183.64 which has the highest average monthly food CPI for years 2005 to 2011 among the low-income households. On the other hand, Bulacan consistently has the lowest average CPI both for All Items and Food components followed by Eastern Samar over the evaluated period.

It should be noted that Tawi-tawi ranked 8th in year 2000 and 1st in year 2006 in the ten poorest provinces in the Philippines as reported by the National Statistical Coordination Board (NSCB). On the other hand, the province of Bulacan was reported by Commission on Audit

(CoA) to be the top income-earner in 2006 and 2007 and second highest income-earner in 2004 and 2005. This appears to support the idea that low-income households in poor provinces and cities experience higher food prices compared to high-earning provinces and cities.

Table 1. Tables of Provinces and Cities with Highest and Lowest Monthly Average All Items CPI for Bottom 30% Households

Top 10 Provinces and Cities with Highest CPI	
Provinces/Cities	**Mean CPI**
Marawi City	185.23
Tawi-tawi	183.64
Northern Samar	173.27
Maguindanao	172.88
Sulu	172.64
Negros Oriental	172.08
Bukidnon	171.32
Davao Oriental	167.69
Southern Leyte	167.18
Misamis Occidental	166.90

Top 10 Provinces and Cities with Lowest CPI	
Provinces/Cities	**Mean CPI**
Bulacan	136.62
Eastern Samar	137.13
Cavite	140.66
Batanes	141.13
Negros Occidental	141.96
Benguet	142.70
Isabela	144.23
Camarines Sur	145.28
Mindoro Occidental	145.59
South Cotabato	146.08

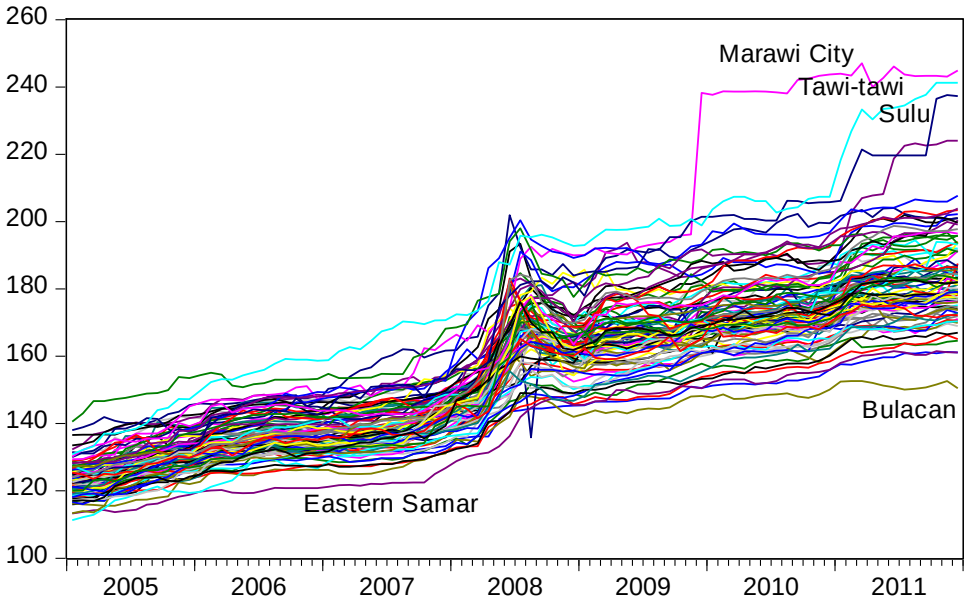
Table 2. Tables of Provinces and Cities with Highest and Lowest Monthly Average Food CPI for Bottom 30% Households

Top 10 Provinces and Cities with Highest CPI	
Provinces/Cities	**Mean CPI**
Tawi-tawi	184.40
Northern Samar	181.12
Sulu	177.60
Maguindanao	176.72
Marawi City	172.01
Bukidnon	171.50
Negros Oriental	171.07
Southern Leyte	170.27
Davao Oriental	168.12
Cebu City	166.33

Top 10 Provinces and Cities with Lowest CPI	
Provinces/Cities	**Mean CPI**
Bulacan	133.17
Eastern Samar	133.91
Cavite	139.47
Abra	141.22
Batanes	141.36
Benguet	142.27
Quezon	142.82
Isabela	143.08
Bataan	143.28
Laguna	143.70

Figure 2 displays the movement of monthly CPI for all items of the bottom 30% income households from years 2005 up to 2011. It could be inferred from the graph that the prices somehow move in the same path, although it could be seen that at the latter years, around 2009 to 2011, there are provinces and cities with CPI which seem to differ from the rest such as that of Marawi City, Tawi-tawi and Sulu. Eastern Samar appears to have the lowest monthly CPI from year 2005 to upper half of 2008; while on the latter part of year 2008 onwards, Bulacan seems to have the lowest monthly CPI for all items.

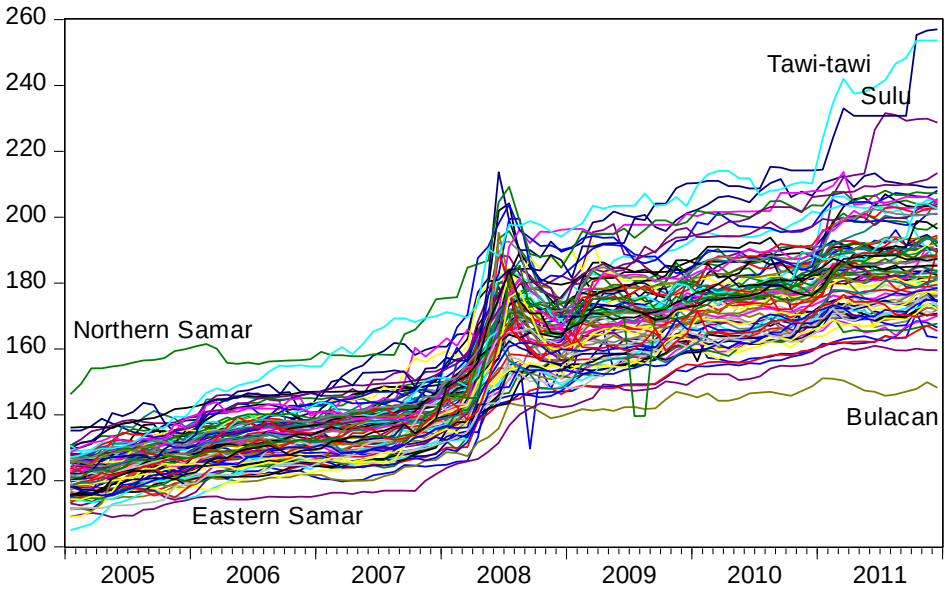
Figure 2. Monthly CPI All Items for Bottom 30% Income Households of all provinces and cities from 2005 to 2011



However, Figure 3 reveals the movement of monthly Food CPI of the bottom 30% income households from years 2005 up to 2011. Compared to the movement of CPI for all items, food prices appear to be more varied although it also seems that food prices of most provinces and cities move in the same fashion. At earlier years, Northern Samar has the highest monthly food CPI while Eastern Samar achieves its lowest. On year 2008, it is evident that most of the provinces and cities are subjected to increase in food prices. Provinces such as Tawi-tawi and

Sulu are among the provinces and cities that show large increase of food prices from year 2009 to 2011, while Bulacan consistently attained the lowest in the same span of years.

Figure 3. Monthly Food CPI for Bottom 30% Income Households of all provinces and cities from 2005 to 2011



Tables 3 and 4 presented on the next page show the provinces and cities with the highest and lowest average monthly inflation rate for CPI for All Items and Food CPI. Among the provinces and cities, Sulu is found to consistently have the highest inflation rate for bottom 30% income households both for All Items and Food components which is 0.81% and 0.93%, respectively. In addition to this, it should also be noted that Marawi City and Iloilo City, both highly urbanized cities, are the 2nd and 4th provincial cities with the highest all items and food inflation rates of 0.80% and 0.70%, respectively. On the other hand, Bulacan has the lowest inflation rate for both series. Moreover, two highly urbanized cities namely, Cebu City and Zamboanga City are found to be two of the provincial cities with the lowest all items and food inflation rates of 0.36% and 0.39%, and 0.41% and 0.40%, respectively.

Table 3. Tables of Provinces and Cities with Highest and Lowest Average Monthly All Items Inflation Rate for Bottom 30% Households

Top 10 Highest Inflation Rate	
Provinces/Cities	**Mean rate**
Sulu	0.8147
Marawi City	0.8046
Tawi-tawi	0.7475
North Cotabato	0.6540
Bukidnon	0.6473
Iloilo	0.6168
Negros Oriental	0.6110
Lanao del Sur	0.6022
Mt. Province	0.5768
Surigao del Sur	0.5768

Top 10 Lowest Inflation Rate	
Provinces/Cities	**Mean rate**
Bulacan	0.3156
Apayao	0.3244
Batanes	0.3452
Cebu City	0.3594
Cebu	0.3897
Zamboanga City	0.3917
Ilocos Norte	0.3962
Cavite	0.4045
Aurora	0.4090
Northern Samar	0.4102

Table 4. Tables of Provinces and Cities with Highest and Lowest Food Inflation Rate for Bottom 30% Households

Top 10 Highest Inflation Rate	
Provinces/Cities	**Mean rate**
Sulu	0.9271
Tawi-tawi	0.8509
Iloilo	0.7195
Iloilo City	0.6983
Bukidnon	0.6966
Lanao del Sur	0.6787
North Cotabato	0.6683
Camiguin	0.6472
Leyte	0.6414
Misamis Oriental	0.6379

Top 10 Lowest Inflation Rate	
Provinces/Cities	**Mean rate**
Bulacan	0.3070
Apayao	0.3293
Batanes	0.3748
Pampanga	0.3993
Zamboanga City	0.3994
Cebu	0.4019
Aurora	0.4096
Basilan	0.4119
Cebu City	0.4123
Ilocos Norte	0.4341

Figures 4 and 5 shows how high the inflation rate of Sulu is compared to the national All Items inflation rate and national food inflation rate, respectively. If a particular provincial/city prices were found to converge towards Sulu prices, then it only means that the prices in that province/city are too high.

Figure 4. Comparing the Movement of National Inflation Rate and Sulu Inflation Rate for All Item Components

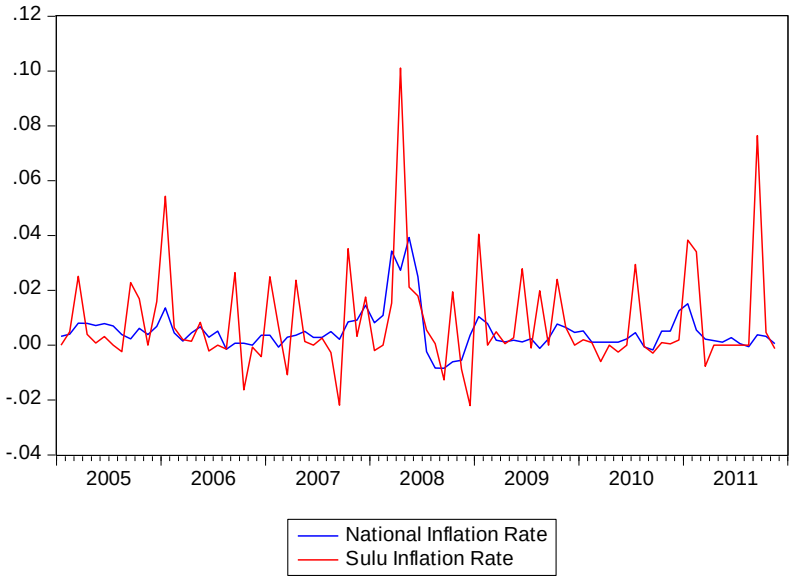
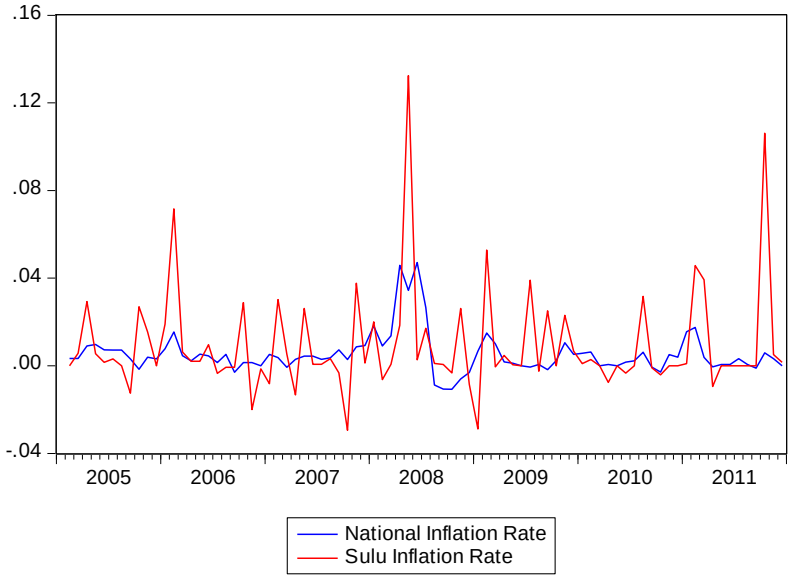


Figure 5. Comparing the Movement of National Inflation Rate and Sulu Inflation Rate for Food Components



To have a general look at the movement of CPI for all items and food components, the regional CPI, which does not include NCR, is presented in Figures 6 and 7. ARMM has the highest monthly CPI both for all items and for food components while Region 4-A has the lowest monthly food CPI. The graphs somehow indicate convergence of prices in the regional level.

Figure 6. Monthly CPI All Items for Bottom 30% Income Households of all Regions from 2005 to 2011

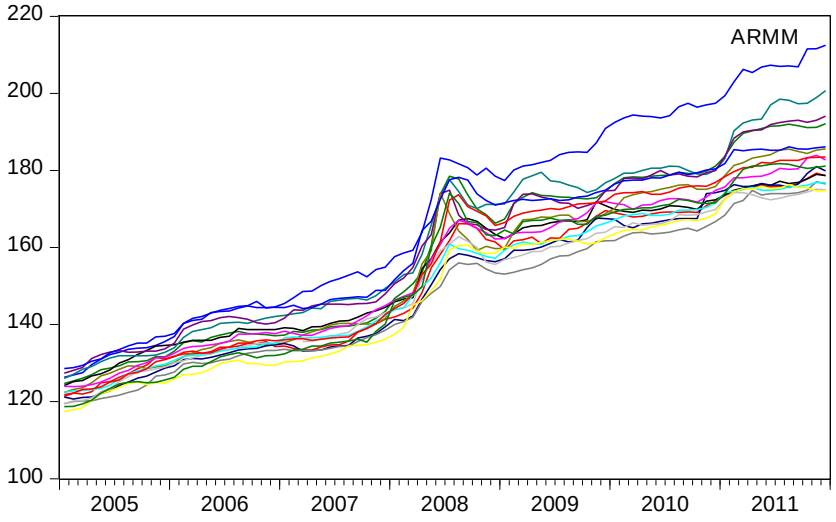
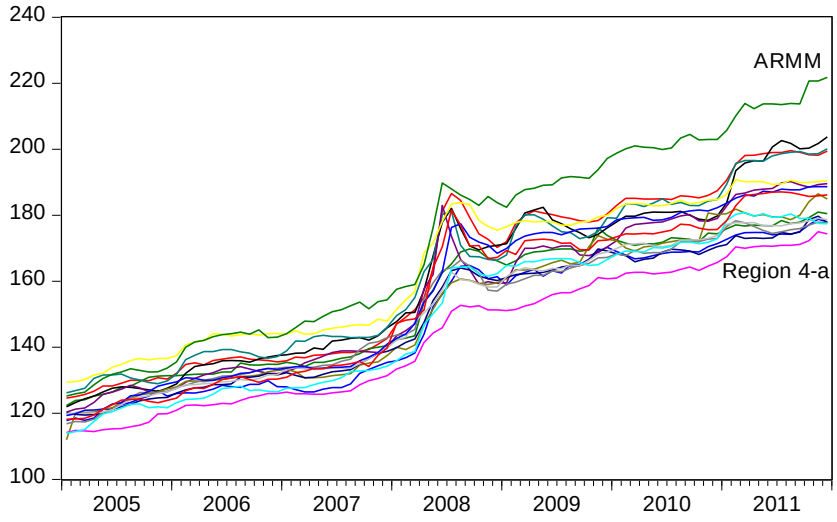


Figure 7. Monthly Food CPI for Bottom 30% Income Households of all Regions from 2005 to 2011



METHODOLOGY

The methodology used in the study is adopted from the methodologies used in the research paper made by Santos, Poblador & Atienza (2008) on *Are Food Prices Biased Towards Metro Manila?: An analysis on the Stochastic and Dynamic Convergence of Provincial Food Prices* and that of Mapa, Sandoval & Yap (2007) in their study on *Regional Economic Growth Convergence in the Philippines*. That is, stochastic and dynamic convergence would be used to attain the objectives of the study. The statistical software Eviews 7.0 is used in performing all the analyses. It should be noted that the data sets used are the CPIs of bottom 30% income households; thus, interpretations of the results of the statistical tests would only be applicable to low-income household groups.

Stochastic convergence pertains to the long-run convergence of provinces' and cities' prices to the national price while dynamic convergence is the short-run convergence of each province or city. In this study, two series will be examined: (1) CPI for all items and (2) CPI for food components of the bottom 30% income households. Tests on stochastic and dynamic convergence will be applied to both series.

To test for stochastic convergence, panel unit root tests using Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) will be conducted to examine if the provinces and cities in study have prices for all items (and for food components alone) that converge to the direction of that of the national. These tests are used to assess the joint convergence of the provinces and cities with the null hypothesis of unit root. Rejection of the hypothesis of unit root implies that all provincial and cities' prices attain stochastic convergence. Hence, prices are moving towards the same path in the long run.

For the dynamic convergence test, time-varying parameter (TVP) model with parameters estimated using Kalman Filter is employed. The state-space representation used is the same with that of Santos, Poblador & Atienza (2008), is as follows:

State equation:

$$\alpha_i(t) = C_\alpha \alpha_i(t-1) + \mu_{i\alpha t}, with\ \mu_{i\alpha t} \sim WN\left(0, {\sigma^2}_{i\mu\alpha}\right)$$

$$\beta_i(t) = C_\beta \beta_i(t-1) + \mu_{i\beta t}, with\ \mu_{i\beta t} \sim WN\left(0, {\sigma^2}_{i\mu\beta}\right)$$

Observation equation:

$$[IR_N - IR_i] = \alpha_i(t) + \beta_i(t)[IR_N - IR_{BASE}] + \varepsilon_{it}, with\ \varepsilon_{it} \sim WN(0, \sigma^2{}_{i\varepsilon})$$

Where IR=monthly inflation rate of CPI All Items (and Food CPI)

N= national average

BASE= province or city with the highest inflation rate for all items (and for food components), which is Sulu in this study

i=specific province or city

t=year

To derive the estimates of coefficients which are the time-varying parameter estimates for each province and city, Kalman Filter smoothing is used; that is, all information about the sample over the time period 2005 to 2011 is utilized in the estimation. The average of the estimated coefficients will reveal which provinces and cities are lagging behind; these are those with negative mean coefficients. In that case, the provincial or city's price is relatively lower than the national average. On the other hand, those with mean greater than zero but is less than one, means that they are converging towards the national average. Lastly, those with mean coefficients equal to one means that the particular province/city has price which converges towards Sulu, the base province. Standard deviations of the estimates determine the magnitude of instability of prices for all items and food components.

RESULTS AND DISCUSSION

Applying the panel unit root test obtained the result that is shown in Table 5. With too small p-values, the test leads to the rejection of the null hypothesis of unit root at 0.01 level of significance. That is, the provinces and cities achieve long-run convergence towards the national CPI for all items.

Table 5. Result of Panel Unit Root Test using LLC for CPI All Items

Method	Statistic	P-value
Levin, Lin & Chu t*	3.41186	0.0003***
Im, Pesaran and Shin W-stat	2.85401	0.0022***

** *significant at α=0.01

For the examination of long-run convergence in food CPI, the same panel unit root tests are applied with the results displayed in Table 6. The test clearly rejects the null hypothesis at different levels of significance (LOS), 0.05 and 0.1, with LLC showing higher significance than IPS. Since the null hypothesis is rejected at 5% and 1% LOS, using LLC and IPS respectively, it is very much likely that the food prices of provinces and cities converge towards the national food prices among the low-income households. The long-run convergence of provincial and cities' food and all items prices towards the national average prices only implies that the prices over all the provinces and cities in study relatively move together.

Table 6. Result of Panel Unit Root Test using LLC for Food CPI

Method	Statistic	P-value
Levin, Lin & Chu t*	1.68738	0.0458**
Im, Pesaran and Shin W-stat	1.57461	0.0577*

* *significant at α=0.05
* significant at α=0.1

Dynamic convergence tests for both series are then applied to determine which provinces and cities are lagging behind and which are converging towards the national price which is determined using the average of the estimated coefficients. All the state-space models and coefficients estimation are performed using Eviews 7.0. The 76 provinces (excluding Sulu) and 11 highly urbanized cities in study are classified as either lagging or converging towards the national growth rate in CPI for all items based on the sign of the mean estimated coefficient. The summary of the classified provinces and cities for the first series, CPI for All Items, is shown in the table on the next page (Table 7), 49 of which are lagging behind and 38 are converging towards the national mean growth rate of CPI for all items. None of the CPI for all items of provinces and cities converges to that of the base province which is Sulu.

Table 7. Subgroupings of Provinces and Cities based on the Mean Smoothed Coefficients of CPI for All Items

Provinces and cities that are lagging behind		
AKLAN	DAVAO CITY	NEGROS ORIENTAL
ALBAY	DAVAO NORTE	NORTH COTABATO
ANTIQUE	DAVAO ORIENTAL	NORTHERN SAMAR
APAYAO	DAVAO SUR	NUEVA VIZCAYA
AURORA	GEN SANTOS CITY	OLONGAPO CITY
BASILAN	ILOILO	PALAWAN
BATANGAS	ILOILO CITY	PANGASINAN
BENGUET	ISABELA	RIZAL
BILIRAN	KALINGA	SARANGGANI
BOHOL	LEYTE	SORSOGON
CAMARINES SUR	MAGUINDANAO	SOUTH COTABATO
CAPIZ	MARAWI CITY	SULTAN KUDARAT
CATANDUANES	MARINDUQUE	SURIGAO DEL NORTE
CAVITE	MASBATE	SURIGAO DEL SUR
CEBU	MINDORO OCCIDENTAL	WESTERN SAMAR
CEBU CITY	MINDORO ORIENTAL	ZAMBALES
	NEGROS OCCIDENTAL	
Provinces and cities that are converging towards national mean growth rate of CPI for All Items		
ABRA	COTABATO CITY	MT PROVINCE
AGUSAN DEL NORTE	EASTERN SAMAR	NUEVA ECIJA
AGUSAN DEL SUR	GUIMARAS	PAMPANGA
BACOLOD CITY	IFUGAO	QUEZON
BAGUIO CITY	ILOCOS NORTE	QUIRINO
BATAAN	ILOCOS SUR	ROMBLON
BATANES	LAGUNA	SIQUIJOR
BUKIDNON	LANAO DEL NORTE	SOUTHERN LEYTE
BULACAN	LANAO DEL SUR	TARLAC
CAGAYAN	LAUNION	TAWI-TAWI
CAGAYAN DE ORO	MISAMIS OCCIDENTAL	ZAMBOANGA CITY
CAMARINES NORTE	MISAMIS ORIENTAL	ZAMBOANGA DEL NORTE
CAMIGUIN		ZAMBOANGA DEL_SUR

The same procedure is performed with the second series, CPI for food components, and the provinces and cities classified as lagging and converging are presented in Table 8 on the next page. 48 of which are found to be lagging behind while 39 are converging towards the national mean growth rate of CPI for food components. Also, none of the food prices of provinces and cities among the low-income households converges to Sulu prices. 43 of the provinces and cities

are both lagging behind in CPI for All Items and Food CPI while 33 of them are both converging towards the national average CPI for all items and CPI for food components.

Table 8. Subgroupings of Provinces and Cities based from the Mean Smoothed Coefficients of Food CPI

Provinces and cities that are lagging behind		
AGUSAN DEL SUR	CEBU CITY	NORTHERN SAMAR
AKLAN	DAVAO CITY	OLONGAPO CITY
ALBAY	DAVAO NORTE	PALAWAN
ANTIQUE	DAVAO ORIENTAL	PAMPANGA
APAYAO	GEN SANTOS CITY	PANGASINAN
BASILAN	ILOILIO CITY	RIZAL
BATANGAS	ILOILO	SARANGANI
BENGUET	LEYTE	SIQUIJOR
BILIRAN	MAGUINDANAO	SORSOGON
BOHOL	MARAWI CITY	SOUTH COTABATO
BULACAN	MARINDUQUE	SOUTHERN LEYTE
CAMSUR	MASBATE	SULTAN KUDARAT
CAPIZ	MINDORO ORIENTAL	SURIGAO DEL NORTE
CATANDUANES	NEGROS OCCIDENTAL	SURIGAO DEL SUR
CAVITE	NEGROS ORIENTAL	WESTERN SAMAR
CEBU	NORTH COTABATO	ZAMBALES
Provinces and cities that are converging towards national mean growth rate of Food CPI		
ABRA	DAVAO SUR	MISAMIS OCCIDENTAL
AGUSAN DEL NORTE	EASTERN SAMAR	MISAMIS ORIENTAL
AURORA	GUIMARAS	MT PROVINCE
BACOLOD CITY	IFUGAO	NUEVA ECIJA
BAGUIO CITY	ILOCOS SUR	NUEVA VIZCAYA
BATAAN	ISABELA	QUEZON
BATANES	KALINGA	QUIRINO
BUKIDNON	LAGUNA	ROMBLON
CAGAYAN	LANAO DEL NORTE	TARLAC
CAGAYAN DEORO	LANAO DEL SUR	TAWI-TAWI
CAMIGUIN	LAUNION	ZAMBOANGA CITY
CAMARINES NORTE	ILOCOS NORTE	ZAMBOANGA DEL NORTE
COTABATO CITY	MINDORO OCCIDENTAL	ZAMBOANGA DEL SUR

The next table (Table 9) aids for further analysis of the results. The table presents the provinces and cities under their respective regions along with their average and standard deviation of their estimated parameter coefficients. Provinces with mean parameter coefficient highlighted in yellow represent those with provincial and cities' prices that are converging towards the national average prices; otherwise, they are lagging behind. It could be seen that there are provinces and cities with prices for all items converging to the national average prices

for all items that are with food prices counterpart lagging behind the national average food prices and vice versa.

Considering the regions where the provinces are located (refer to Table 9), for All Items CPI, majority of provinces in Ilocos Region, Central Luzon, Western and Northern Mindanao have prices that are converging towards the national prices. On the contrary, MIMAROPA (Occidental and Oriental Mindoro, Marinduque, Romblon and Palawan), Bicol Region, Western, Central and Eastern Visayas, Southern and Central Mindanao are regions with most provinces having prices for all items that are relatively lower than the national average price. These latter regions are all found at the lower part of the country.

For food prices alone, Ilocos Region, Cagayan Valley, Western and Northern Mindanao, and CAR are regions where most provinces have prices converging towards the national average food prices, while Bicol Region, Western, Central and Eastern Visayas, Southern and Central Mindanao and CARAGA regions have majority of provinces under them with food prices lower than the national food prices. Here, it is more apparent that the former aforementioned regions are at the upper part of the country while the latter regions are at the lower part.

It should be noted that CARAGA, ARMM, Western Mindanao, Bicol Region, Eastern Visayas, Northern Mindanao and Central Visayas have higher poverty incidences compared to the rest of regions during the years 2003, 2006 and 2009 according to the 2009 official poverty statistics reported by the NSCB. In fact, CARAGA and ARMM consistently have the highest poverty incidence among families in 2006 and 2009. Regions in the upper part of the country such as Ilocos Region, CAR, Cagayan Valley, Central Luzon and CALABARZON (Cavite, Laguna, Batangas, Rizal, and Quezon) obtained low poverty incidences in those years.

Zooming in to provincial level, the provinces of Cebu, Negros Occidental, Camarines Sur and Pangasinan have the biggest share in the total number of poor families although these provinces have lower prices for all commodities and even for food alone compared to the national prices. It appears that there are locations in the Philippines with lower prices compared to other areas in the country; however, they are also where more poor families are residing in. This seems to imply that lower prices alone could not reduce poverty.

Furthermore, Bicol region, Western and Central Visayas have the biggest number of poor families in 2003, 2006 and 2009. These regions have the majority of its provinces that have lower prices both for all items and food prices compared to the national prices. On the other hand, CAR and Cagayan Valley, whose provinces have prices converging towards the national price, appear to have lesser number of poor families. This result happens to contradict the findings from the study of Santos et al (2008) that many of the provinces with lower prices have the lowest poverty incidence in 2006. Perhaps this is because the data that they used are over the period from January 1988 to June 2008 which is a 20-year span, whereas in this study, the recent data are considered, that is from January 2005 to December 2011. Another reason could be because the CPI utilized in their study is for all households, wherein here, the data are focused only on the low-income households. Thus, the market baskets and product prices are those that are purchased by the poorest of the poor. Also, their study used only the FBT (Food, beverage, and tobacco) series while in this study, food and all items CPIs were used.

Table 9. Provinces and Cities on their respective Regions Classified as Converging* towards or Lagging behind the National Average Prices for the Two Series in Review**

ALL ITEMS		
Region 1: Ilocos Region		
Ilocos Norte	6.15E-06	0.000103
Ilocos Sur	2.95E-06	0.000047
La Union	2.25E-06	0.000045
Pangasinan	-1.48E-05	0.000087
Region 2: Cagayan Valley		
Batanes	4.59E-06	0.000074
Cagayan	5.07E-06	0.000136
Isabela	-2.11E-06	0.000094
Nueva Vizcaya	-2.48E-08	0.000078
Quirino	3.37E-05	0.000188
Region 3: Central Luzon		
Bataan	2.97E-06	0.000049
Bulacan	1.24E-06	0.000063
Nueva Ecija	2.49E-05	0.000127
Pampanga	1.25E-06	0.000072
Tarlac	9.12E-06	0.000090
Zambales	-4.52E-06	0.000063
Aurora	-3.70E-07	0.000065
Olongapo City	-1.68E-06	0.000060

FOOD		
Region 1: Ilocos Region		
Ilocos Norte	1.02E-05	0.000181
Ilocos Sur	1.35E-05	0.000117
La Union	5.49E-06	0.000082
Pangasinan	-2.14E-05	0.000149
Region 2: Cagayan Valley		
Batanes	4.42E-05	0.000250
Cagayan	7.44E-06	0.000060
Isabela	4.65E-06	0.000179
Nueva Vizcaya	1.00E-06	0.000134
Quirino	6.74E-05	0.000327
Region 3: Central Luzon		
Bataan	1.78E-05	0.000112
Bulacan	-7.99E-06	0.000144
Nueva Ecija	4.27E-05	0.000263
Pampanga	-2.83E-06	0.000139
Tarlac	1.62E-05	0.000171
Zambales	-3.33E-06	0.000106
Aurora	5.35E-06	0.000135
Olongapo City	-1.08E-05	0.000152

Region 4a: CALABARZON		
Batangas	-3.56E-06	0.000049
Cavite	-2.73E-06	0.000066
Laguna	2.48E-06	0.000091
Quezon	3.00E-07	0.000077
Rizal	-1.88E-06	0.000089
Region 4b: MIMAROPA		
Marinduque	-5.61E-06	0.000070
Mindoro Occidental	-3.22E-06	0.000053
Mindoro Oriental	-2.12E-05	0.000106
Palawan	-1.12E-05	0.000054
Romblon	1.10E-05	0.000060
Region 5: Bicol Region		
Albay	-9.45E-06	0.000053
Camarines Norte	1.49E-06	0.000056
Camarines Sur	-1.14E-05	0.000082
Catanduanes	-3.92E-06	0.000052
Masbate	-6.73E-06	0.000074
Sorsogon	-1.24E-06	0.000051
Region 6: Western Visayas		
Aklan	-4.16E-06	0.000066
Antique	-1.22E-05	0.000065
Capiz	-1.56E-05	0.000072
Iloilo	-1.11E-05	0.000128
Negros Occidental	-1.06E-05	0.000105
Bacolod City	9.16E-07	0.000117
Iloilo City	-1.35E-05	0.000094
Guimaras	3.44E-06	0.000094
Region 7: Central Visayas		
Bohol	-2.39E-06	0.000095
Cebu	-8.81E-06	0.000065
Negros Oriental	-1.04E-05	0.000079
Siquijor	7.84E-07	0.000047
Cebu City	-9.63E-06	0.000050
Region 8: Eastern Visayas		
Eastern Samar	2.45E-06	0.000074
Leyte	-7.87E-06	0.000055
Biliran	-5.52E-06	0.000096
Northern Samar	-1.64E-05	0.000109
Western Samar	-1.08E-05	0.000069
Southern Leyte	2.98E-07	0.000045

Region 4a: CALABARZON		
Batangas	-3.07E-06	0.000099
Cavite	-1.24E-06	0.000126
Laguna	1.29E-05	0.000174
Quezon	2.49E-06	0.000144
Rizal	-5.39E-06	0.000149
Region 4b: MIMAROPA		
Marinduque	-1.09E-05	0.000141
Mindoro Occidental	1.46E-06	0.000128
Mindoro Oriental	-4.16E-05	0.000202
Palawan	-1.61E-05	0.000092
Romblon	2.54E-05	0.000135
Region 5: Bicol Region		
Albay	-1.22E-05	0.000090
Camarines Norte	2.14E-06	0.000110
Camarines Sur	-1.88E-05	0.000154
Catanduanes	-1.08E-05	0.000094
Masbate	-1.28E-05	0.000167
Sorsogon	-8.02E-06	0.000153
Region 6: Western Visayas		
Aklan	-8.02E-06	0.000147
Antique	-1.80E-05	0.000116
Capiz	-1.90E-05	0.000145
Iloilo	-2.44E-05	0.000244
Negros Occidental	-1.65E-05	0.000193
Bacolod City	3.15E-06	0.000231
Iloilo City	-2.48E-05	0.000187
Guimaras	2.13E-05	0.000197
Region 7: Central Visayas		
Bohol	-2.72E-05	0.000208
Cebu	-9.22E-06	0.000114
Negros Oriental	-1.90E-05	0.000146
Siquijor	-1.01E-05	0.000510
Cebu City	-1.13E-05	0.000100
Region 8: Eastern Visayas		
Eastern Samar	9.41E-06	0.000139
Leyte	-4.51E-06	0.000115
Biliran	-1.27E-05	0.000169
Northern Samar	-3.19E-05	0.000210
Western Samar	-1.65E-05	0.000134
Southern Leyte	-1.43E-08	0.000087

Region 9: Western Mindanao		
Zamboanga del Norte	1.79E-05	0.000227
Zamboanga del Sur	1.01E-05	0.000149
Zamboanga City	1.16E-05	0.000118
Region 10: Northern Mindanao		
Bukidnon	9.84E-06	0.000086
Camiguin	8.02E-06	0.000071
Lanao del Norte	1.15E-05	0.000138
Misamis Occidental	2.27E-05	0.000212
Misamis Oriental	2.24E-06	0.000052
Cagayan de Oro City	4.79E-06	0.000051
Region 11: Southern Mindanao		
Davao Norte	-1.53E-06	0.000117
Davao Sur	-2.50E-06	0.000052
Davao Oriental	-1.27E-05	0.000092
Davao City	-4.17E-06	0.000051
Region 12: Central Mindanao		
North Cotabato	-8.65E-06	0.000085
South Cotabato	-1.02E-05	0.000066
Sultan Kudarat	-2.27E-05	0.000126
Cotabato City	2.48E-06	0.000051
Gen. Santos City	-5.09E-06	0.000059
Saranggani	-1.52E-06	0.000120
Region 13: CAR		
Abra	1.76E-05	0.000175
Benguet	-6.49E-06	0.000061
Ifugao	1.59E-06	0.000089
Kalinga	-3.37E-06	0.000059
Mt. Province	3.22E-05	0.000158
Baguio City	6.93E-07	0.000083
Apayao	-1.21E-05	0.000093
Region 14: ARMM		
Basilan	-1.22E-07	0.000074
Lanao del Sur	5.64E-06	0.000093
Maguindanao	-1.29E-05	0.000113
Sulu		
Tawi-tawi	3.80E-05	0.000158
Marawi City	-1.10E-05	0.000104
Region 15: CARAGA		
Agusan del Norte	2.12E-05	0.000194
Agusan del Sur	9.32E-07	0.000104

Region 9: Western Mindanao		
Zamboanga del Norte	3.58E-05	0.000390
Zamboanga del Sur	1.20E-05	0.000211
Zamboanga City	1.06E-05	0.000199
Region 10: Northern Mindanao		
Bukidnon	1.82E-05	0.000158
Camiguin	9.20E-06	0.000137
Lanao del Norte	2.68E-05	0.000275
Misamis Occidental	3.43E-05	0.000396
Misamis Oriental	6.01E-06	0.000102
Cagayan de Oro City	3.37E-06	0.000108
Region 11: Southern Mindanao		
Davao Norte	-8.32E-06	0.000231
Davao Sur	1.33E-06	0.000093
Davao Oriental	-3.28E-05	0.000227
Davao City	-7.47E-06	0.000113
Region 12: Central Mindanao		
North Cotabato	-2.72E-05	0.000218
South Cotabato	-2.41E-05	0.000139
Sultan Kudarat	-5.61E-05	0.000352
Cotabato City	1.37E-05	0.000085
Gen. Santos City	-1.00E-05	0.000133
Saranggani	-3.00E-06	0.000289
Region 13: CAR		
Abra	4.52E-05	0.000391
Benguet	-8.37E-06	0.000120
Ifugao	1.01E-05	0.000158
Kalinga	6.76E-06	0.000139
Mt. Province	5.72E-05	0.000312
Baguio City	4.91E-06	0.000182
Apayao	-1.23E-05	0.000187
Region 14: ARMM		
Basilan	-6.36E-06	0.000130
Lanao del Sur	1.28E-05	0.000201
Maguindanao	-3.54E-05	0.000319
Sulu		
Tawi-tawi	7.37E-05	0.000335
Marawi City	-1.29E-05	0.000201
Region 15: CARAGA		
Agusan del Norte	4.60E-05	0.000370
Agusan del Sur	-1.36E-05	0.000255

Surigao del Norte	-1.71E-06	0.000086	Surigao del Norte	-4.36E-06	0.000160
Surigao del Sur	-3.24E-06	0.000100	Surigao del Sur	-2.28E-05	0.000259

*Converging provinces and cities are those with mean coefficients highlighted in yellow
**Provinces and cities that are lagging behind are without highlights

The next two graphs (Figures 8 and 9) present the smoothed beta coefficients derived for the provinces and cities of CPI for All Items and Food CPI among the bottom 30% income households during the years 2005 to 2011. In both graphs, large fluctuations of the smoothed beta coefficients can be observed during 2008 and 2011. Although there are high fluctuations, none is high enough to reach a beta coefficient of one which would mean that high food prices will be experienced by that particular province or city.

Figure 8. Graph of the Estimated Beta Coefficients of CPI for All Items

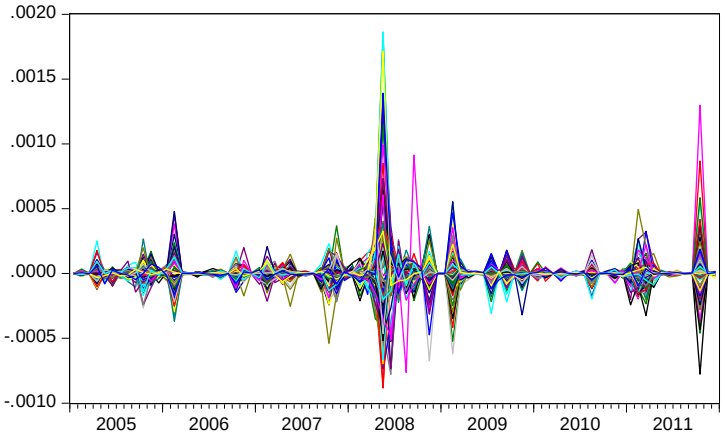
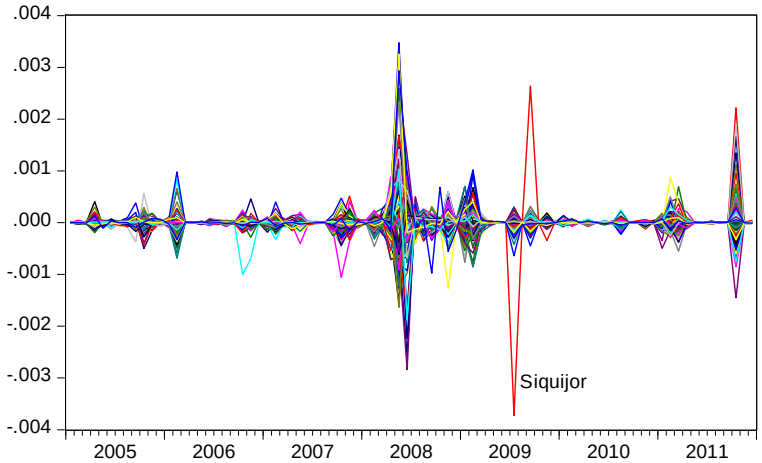


Figure 9. Graph of the Estimated Beta Coefficients of Food CPI



CONCLUSION

Poverty is undeniably one of the biggest concerns in the Philippines; hence poverty reduction is a target that this country aims to achieve. To have a clear picture of what poverty is and what affects it, so as to know how to reduce it; one should study those who belong to the poorest of the poor, the very people who experience it more.

National Statistics Office (NSO) provided data for the CPI of bottom 30% income households that could be used to examine how the changes in prices purchased by the low-income earners could affect them.

In this paper, the data of CPI for all items in the bottom 30% income households over the time period 2005 to 2011 were utilized in the study. Also, CPI data for food components were also used since it was found out that in the Philippines, one of the characteristics common to poor households is its high expenditure on food. These two series, (1) All Items CPI and (2) Food CPI, are the focus of the paper.

Stochastic and dynamic convergence tests are employed for the CPI All Items and Food CPI for 77 provinces and 11 highly urbanized cities, which is in all, equals to 88 locations in the Philippines. It is found out that the sample in the study both converge in the long run to the national average CPI for all items and CPI for food components among low-income household groups. This only indicates that there will come a time when the prices for all items and food prices among the poor households in the provinces would be the same as the national prices.

Based from the results of dynamic convergence test, for prices of all items, 49 provinces and cities were found to experience relatively lower prices compared to other provinces, while for food prices alone, 48 of them were found to lag behind the national food prices. That is, among the bottom 30% income group, more than half of the provinces and cities have food prices and all items' prices that are lower than the national average prices. This somehow suggests that low income households in those provinces and cities are less burdened in terms of purchasing their everyday food and commodities since they have relatively more affordable commodity prices in their area compared to other poor households located in some provinces and cities. Also, 43 of the provinces and cities are both lagging behind in CPI for All Items and Food

CPI while 33 of them are both converging towards the national average CPI for all items and CPI for food components.

It was also found in the study that regions with provinces and cities having lower food and all item prices are also those which have high poverty incidences in years 2003, 2006 and 2009. In fact, the provinces of Cebu, Negros Occidental Camarines Sur and Pangasinan which have the biggest share in the total number of poor families are provinces which also have lower prices for all commodity items and food items compared to the national prices. This suggests that policy on prices seem to get better than before, seeing as from the findings of Santos et al on their study in 2008 that the contrary to the result of this study was found out, that is, provinces with lower prices are also those with lowest poverty incidence in 2006.

However, another way to look at it is that, areas in the country with lower prices also have comparatively larger number of poor households compared to other areas, which implies that lower commodity prices alone could not trim down the poverty incidence in the Philippines. It is noteworthy to mention that according to a study conducted by economists (Collas-Monsod et al 2004) from the University of the Philippines, geographical (climate, topography, access to markets) and political economic factors (political dynasty and pervasive conflict) are pervasive causes in the achievements in poverty reduction at one end, and the persistence of poverty, at the other (Cañares 2009). Hence, other factors contributing to poverty of Filipinos belonging in the low-income brackets should also be attacked with better policies.

Also, interventions in the existing price policies in the provinces and cities that are found to have food prices and prices for all items converging towards the national prices should also be made to improve and develop better policies that could help lighten up the prices they experience which in consequence could facilitate in advancement of the way of life of the poor households in those provinces.

To further improve the analysis, the data on National Capital Region should be included. The researchers fall short in getting the data for it. Also, factors that could be attributed to the subgroupings of provinces could be assessed to examine the similarities of those included in the particular sub grouping.

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