

Dikhanov, Yuri; Palanyandy, Chellam; Capilit, Eileen

Working Paper

Subnational Purchasing Power Parities toward Integration of International Comparison Program and Consumer Price Index: The Case of the Philippines

ADB Economics Working Paper Series, No. 290

Provided in Cooperation with:

Asian Development Bank (ADB), Manila

Suggested Citation: Dikhanov, Yuri; Palanyandy, Chellam; Capilit, Eileen (2011) : Subnational Purchasing Power Parities toward Integration of International Comparison Program and Consumer Price Index: The Case of the Philippines, ADB Economics Working Paper Series, No. 290, Asian Development Bank (ADB), Manila,
<https://hdl.handle.net/11540/1991>

This Version is available at:

<https://hdl.handle.net/10419/109425>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/3.0/igo>

ADB Economics Working Paper Series



Subnational Purchasing Power Parities toward Integration of International Comparison Program and Consumer Price Index: The Case of the Philippines

Yuri Dikhanov, Chellam Palanyandy, and Eileen Capilit
No. 290 | December 2011



ADB Economics Working Paper Series No. 290

Subnational Purchasing Power Parities toward Integration of International Comparison Program and Consumer Price Index: The Case of the Philippines

Yuri Dikhanov, Chellam Palanyandy, and Eileen Capilit

December 2011

Yuri Dikhanov is Senior Economist at the World Bank; Chellam Palanyandy is Lead Statistician, and Eileen Capilit is Associate Economics and Statistics Officer at the Development Indicators and Policy Research Division, Economics and Research Department, Asian Development Bank. The authors thank Paul McCarthy, Virginia Gañac, Rosie Sta. Ana, and Elena Varona for their valuable inputs; and Prasada Rao and Douglas Brooks for their comments. The paper also benefited from discussions with Administrator Carmelita ERICTA and the technical staff of the National Statistics Office of the Philippines. The authors accept responsibility for any errors in the paper.

Asian Development Bank

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics

©2011 by Asian Development Bank
December 2011
ISSN 1655-5252
Publication Stock No. WPS124253

The views expressed in this paper
are those of the author(s) and do not
necessarily reflect the views or policies
of the Asian Development Bank.

The ADB Economics Working Paper Series is a forum for stimulating discussion and eliciting feedback on ongoing and recently completed research and policy studies undertaken by the Asian Development Bank (ADB) staff, consultants, or resource persons. The series deals with key economic and development problems, particularly those facing the Asia and Pacific region; as well as conceptual, analytical, or methodological issues relating to project/program economic analysis, and statistical data and measurement. The series aims to enhance the knowledge on Asia's development and policy challenges; strengthen analytical rigor and quality of ADB's country partnership strategies, and its subregional and country operations; and improve the quality and availability of statistical data and development indicators for monitoring development effectiveness.

The ADB Economics Working Paper Series is a quick-disseminating, informal publication whose titles could subsequently be revised for publication as articles in professional journals or chapters in books. The series is maintained by the Economics and Research Department.

Contents

Abstract	v
I. Background	1
II. Objectives	3
III. Challenges	4
IV. ICP and CPI: Establishing the Link between Spatial and Temporal Indexes	5
A. International Comparison Program	5
B. Consumer Price Indexes	6
C. Subnational PPPs: Applying ICP Concepts to CPI Information	6
V. The Philippines CPI	7
A. Scope and Coverage	7
B. Data Structure	8
VI. Estimation Methodology: Subnational PPP	11
A. Organization of Data for Computing Subnational PPPs	13
B. Determining Product Overlaps	14
C. Subnational PPP Aggregation	15
VII. Major Results and Findings of the Study	19
VIII. Conclusion and Future Directions	22
Appendix: Tables and Charts by Major Commodity Groups	24
References	32

Abstract

The International Comparison Program (ICP) compares levels of economic activity and relative price levels among countries of the world. The main feature of the ICP is that it produces spatial indexes or purchasing power parities (PPPs) that allow cross-country comparison of gross domestic product (GDP) and its major aggregates. While the PPPs produced from ICP are spatial indexes, the consumer price index (CPI) is temporal and measures the changes in the average prices of a fixed basket of goods and services purchased by households from one period to another. This paper describes how information from the CPI can be used for intracountry comparisons of price levels (spatial comparisons) that would be consistent in the temporal dimension. In this way the output is temporally consistent subnational price levels (subnational PPPs) that can be used in regional price comparisons, real income dimension of human development indexes, poverty estimates, regional cost of living indexes, etc.

This study aims to analyze the plausibility of integrating ICP with the Philippines' CPI by computing subnational PPPs using regional prices and expenditure weights from the CPI. This study also aims to find out whether prices collected for the CPI could be used to provide reliable estimates of price levels for a range of products in each region, and show if the relationships between these price levels are consistent with information coming from the ICP process. The current project using data collected from the Philippines' CPI has shown that the subnational price levels obtained from both the CPI and ICP processes are broadly similar.

The study shows that all regional price movements are highly correlated, which is probably an indication of efficiency of the markets. However, the substitution effects cannot be studied right now as the only available expenditure structure at the time of subnational PPP estimation is for 2000. Incorporating substitution effects of changing expenditure patterns should improve the estimate.

I. Background

The International Comparison Program (ICP) is a worldwide statistical project designed to compare levels of economic activity and relative price levels among countries of the world. Each country's national accounts serve as bases of the international comparisons, so that the broadest estimate of economic activity provided by the ICP is gross domestic product (GDP), which measures the gross value added of all resident producers in an economy (e.g., a country or region within a country). The main feature of the ICP is that it produces spatial indexes or purchasing power parities (PPPs) that allow cross-country comparison of GDP and its major aggregates for all countries, expressed in a common currency. Common prices and GDP deflators are obtained by establishing regional baskets of goods and services that are priced by every participating country within each region. In the 2005 ICP, the regional PPPs are calibrated to the global PPP by forming "ring countries" for each region that are required to price items from a common ring list of goods and services.¹ In the same manner, the relative price levels of countries can be compared using PPPs in conjunction with exchange rates to derive price level indexes.

A major drawback for the ICP implementation is the amount of resources involved in conducting a benchmark ICP on a more regular basis. Given the relative importance of the ICP outputs, it is imperative that the program be sustained and outputs be produced in a more timely and cost-efficient manner. It is for this purpose that attempts are being made to harmonize ICP with the regular price collection of countries, especially during conduct of price surveys for the consumer price index (CPI). However, doing so is not as straightforward as one would hope it to be.

A more important consideration is that while the PPPs produced from ICP are spatial indexes, the CPI is temporal and basically measures the change in the average prices of a fixed basket of goods and services purchased by households from one period to another (monthly, quarterly, annually). The CPI is mainly expressed as an index number relative to a base year, which is set equal to 100. The prices for each product group for each month are compared with those in the base year and weighted by their relative consumption in the base year. The weight is the expenditure on a product (or group of products), which indicates the relative importance of that product (or product group) in the overall basket of goods and services included in the CPI.

¹ For a thorough discussion on the ring comparison, see World Bank (2008).

From the experiences gained from the 2005 ICP for Asia and the Pacific and in the implementation of the research initiative on updating the benchmark 2005 PPP to 2009,² the Asian Development Bank (ADB) recognized that the key to achieving sustainability of the ICP and its gradual integration in the regular price collection particularly the CPI is for countries to have a better understanding and appreciation of the importance of PPP concepts and methods. To achieve this, it is imperative to establish how the ICP methods can be applied in a country setting; to identify what is the linkage between ICP and their regular CPI work; and to illustrate how subnational or intraregional PPPs can be used for intracountry spatial comparisons. Likewise, the ways in which the subnational PPPs can improve and/or serve as inputs for estimating regular major economic indicators such as real regional price comparison, real income dimension of human development indexes, as well as poverty estimates produced by countries, play an important role in advocating and increasing the chances for overall sustainability of the ICP.

A direct use of regional price levels is to calculate PPPs that can be used for analyzing poverty levels within a country. Apart from the prices themselves, the other critical elements required are data on regional expenditures cross-classified by incomes. During the 2005 ICP, the ICP Global Office at the World Bank established a Poverty Advisory Group to provide advice on the methods to be adopted for assessing poverty lines using ICP data. The Group suggested that poverty PPPs should be compiled using basic heading PPPs from the ICP, but reweighted using expenditures specific to the poor. An assumption is made in this process that the prices faced by the poor are proportional to national average prices in each of the countries being compared. The method was pilot tested by ADB through the Research Study on Poverty-Specific PPP for Selected Countries in Asia and the Pacific.³ It should be noted, however, that one of the “main findings of the research study is that the use of price data from poverty-specific price surveys resulted in a bigger change than just the replacement of weights by the expenditure weights of the poor in computing the poverty PPPs” (ADB 2008, 84). The result further indicated that the ICP products may not be a good proxy for the goods and services used by the poor and the effect could be significant for some. However, for low-income countries, where the differences in type and quality of goods and services consumed by the poor and the general population are likely to be less pronounced, then the benefit of using poverty-specific price surveys can be marginal compared with the difference made by the use of weights representing the expenditure patterns of the poor. From the research study, one can further infer that low-income countries may use existing

² The Regional Technical Assistance (RETA 6482: Improving Price Collection of Non-Household Expenditure Components and Updating Purchasing Power Parity Estimates for Selected Developing Member Countries) is participated in by 21 economies including: Bangladesh; Bhutan; Brunei Darussalam; Cambodia; the People's Republic of China (PRC); the Republic of Fiji; Hong Kong, China; India; Indonesia; the Lao People's Democratic Republic; Malaysia; the Maldives; Mongolia; Nepal; Pakistan; the Philippines; Singapore; Sri Lanka; Taipei, China; Thailand; and Viet Nam. The same group of economies participated in the 2005 ICP Asia Pacific along with two other non-ADB members, Macao, China and Islamic Republic of Iran (see ADB 2009).

³ Under RETA 6088 (ADB 2008), 16 economies, namely, Bangladesh, Bhutan, Cambodia, the Republic of Fiji, India, Indonesia, the Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, and Viet Nam participated in this study, which used the Malaysian Ringgit as the numeraire currency.

CPI prices or infrastructure and the weights that correspond to the poor and determine the national poverty line that is consistent with the approaches and method for estimating an international poverty line.

In the Philippines, the Family Income and Expenditure Survey (FIES) provides a very important data set for poverty analysis. To implement an approach that is similar to the ADB poverty-specific PPP research study, data on the consumption patterns of low-income households must be derived for each region's PPPs. It is necessary to match the PPPs calculated from the CPI-based price levels with income levels that are relevant to the poor. Hence, the optimal approach is to calculate PPPs based on the market basket of the bottom 30% and the expenditure weights of the bottom 30% that is derived from the FIES.⁴ The main focus of this paper, however, is more on a generalized approach in obtaining subnational PPP estimates.

II. Objectives

Since the 2005 ICP, there have been demands from countries for training on ICP methods and subnational PPP compilation. Hence, in-country trainings for directors and technical staff on these areas were conducted for national implementing agencies of Bangladesh, Cambodia, the Peoples' Republic of China, India, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, and Viet Nam between 2008 and 2010. These training created opportunities for both the ADB and the national implementing agencies to explore the viability of integrating ICP with CPI to appreciate more the vital role that subnational PPP compilation can play in the integration of these two important price concepts.

The National Statistics Office of the Republic of the Philippines (the PNSO), which is one of the 10 statistical offices whose subnational PPPs have been explored, is the main subject of this paper. The main objective of this paper is to examine the extent to which CPI price data could be used to compare price levels between regions or areas within a country. Regional price levels for the 17 major regions in the Philippines are compared by applying the PPP concepts and methodology for broad product subgroups (e.g., Cereals and cereal preparation); for main categories (e.g., Food, beverages and tobacco); and Total personal consumption expenditures (PCE). A second aim is to establish whether it would be possible to collect ICP prices from only a handful of regions (or perhaps in only one region or capital city) and adjust the collected price levels to national average prices using the regional relationships identified from the CPI database after calculating the relationships between price levels in the various regions.

⁴ NSCB (2009) provides details on the market basket determination and cut-off points for the expenditure weights of the bottom 30% of the population.

III. Challenges

One of the recommendations in the 2005 ICP for Asia and the Pacific report (ADB 2007) is for ADB to explore the extent to which ICP products could be included in each economy's CPI. Incorporating ICP products in the CPI is difficult in practice because the criteria for selecting products in the CPI are not the same as those for the ICP. In particular, representativity is the key criterion for selecting a product for the CPI while comparability of products across countries does not weigh in at all. On the other hand, products for the ICP are selected so that the competing aims of representativity within countries and comparability between countries are both taken into account.

The scope of the CPI data is broadly consistent with that of household final consumption expenditure in the national accounts (the main difference is that the rent imputed for owner-occupied dwellings is not usually included in a CPI). Conceptually, the methods used to construct subnational PPPs are identical to those used in the ICP. The requirements for price data are the same as those for the ICP; namely, they should be representative of consumers' expenditures and comparable across regions within the country. Representativity is not viewed as an issue in these subnational comparisons because a product will not be included in a country's CPI basket unless it is representative. Comparability can pose some problems, but less so than in international comparisons. The main issue concerning comparability is that the staff collecting products for the CPI often have the option of selecting the actual product to be priced within a set of broad parameters that distinguish the type of product to be selected.

Apart from satisfying the broad specifications, the main criterion in selecting a product to be priced for the CPI is that it should be possible to identify exactly the same product each month so that the prices observed are not affected by changes in quality. Therefore, the actual products priced for the CPI are not necessarily identical in different regions (and sometimes not even within a single region). For example, the specifications for a TV set may describe the screen size, the type of audio system, whether it is high-definition, and whether it is liquid crystal display or plasma. However, the brand of TV to be included in the CPI is left to the discretion of the price collector, based on the brand that dominates the sales in each retail outlet. While the brand can be a significant contributor to the price to be paid, the important aspect from the CPI viewpoint is that the same brand (and model) is priced each month so that changes in price can be observed. For subnational PPPs, it is necessary to take the extra step of matching the prices for those TV sets that not only meet the CPI specifications but are also of the same brand (and model) if they are price-determining characteristics.

IV. ICP and CPI: Establishing the Link between Spatial and Temporal Indexes

A parallel can be drawn between time series price indexes and PPPs. The index number theory underlying both time series and spatial indexes is very similar. In some cases, prices that have been collected for time series price indexes can also be used to construct PPPs but it is necessary to collect additional prices for international comparisons. The main reason is that PPPs require not only comparability (between countries rather than over time but they must also be somehow representative of the expenditures in each country in the comparison. By definition, the products priced for use in a price index within a country are representative of the expenditures in that country, otherwise they would not have been in the basket of goods and services to be priced. However, when products are being selected for pricing in the ICP, they must be both comparable between countries and representative of the expenditures in each country. In practice, each product specified for pricing in the ICP will not be priced by every country because of this representativity requirement. For example, beef is not a representative product in some countries but it is in many others, which can readily collect beef prices. The PPPs for meat between all countries were constructed by comparing the prices of different types of meat (beef, veal, goat, lamb, mutton, goat, poultry) between each pair of countries for which each type of meat is representative and for which prices were collected.

This section describes the nature and concepts of ICP, the CPI, and explores a way in which concepts and information derived from these two price indexes that normally are meant to serve different purposes—spatial and temporal comparisons, respectively—can be integrated to construct subnational PPPs.

A. International Comparison Program

The ICP uses values from each country's national accounts in calculating real expenditures (real expenditure equals value in national currency divided by its corresponding PPP). A basic heading PPP can be used to divide the GDP values for that basic heading to provide direct estimates of its real expenditure. However, basic heading PPPs have to be combined to estimate real expenditures for broader aggregates. It is necessary to use the basic heading values as weights to calculate PPPs for each of those broader aggregates, up to the level of GDP.

In their simplest form, PPPs are the ratios of prices between different localities (countries or regions) and, as a result, they are often referred to as providing “spatial comparisons” of price levels. Formally, a PPP between two countries, A and B, is a price ratio that measures the number of units of country A's currency that are needed in country A to purchase the same quantity of an individual good or service as one unit of country B's

currency will purchase in country B. PPPs are expressed in terms of the currency of a base country. In the 2005 ICP, Hong Kong, China was the base country in the Asia and Pacific region. Hence, the Hong Kong Dollar was the base, or “numeraire”, currency in which the real expenditures of all countries in the region were expressed.

B. Consumer Price Indexes

A price index measures changes over time in the prices of the goods and/or services within its defined scope. Price indexes can be compiled for any period (e.g., month or quarter or year) but, most commonly, they are compiled monthly. Their scope can be the country as a whole or one or more regions within a country (e.g., for the main city or a handful of major cities only). CPI is designed to measure changes in the prices of consumer goods and services purchased by the “target population”, which may be all persons living in the country or some subset of them (e.g., wage and salary earners, or all persons excluding the bottom 20% of income earners). In the regular CPI compilation, the components of a price index that includes a regional dimension may be published for each region as well as for the country as a whole. However, it is important to note that the regional index numbers do not provide a measure of differences in price levels between the regions. Rather, they provide a measure of the changes in prices in each region from the base period (i.e., the period for which the index is set equal to 100). For example, price indexes of 120.0 in region A and 125.0 in region B mean that prices have risen 20% in region A and 25% in region B since the base period. However, if prices were 10% lower in region B than in region A in the base period, then they would still be about 6% lower in region B than in region A despite the higher rate of price increase observed.

C. Subnational PPPs: Applying ICP Concepts to CPI Information

The theory and processes underlying international comparisons can also be applied to produce subnational PPPs and compare price levels between regions within an economy. In fact, it is often easier to compare regions within an economy than it is to compare countries because the representativity requirement is almost always easier to meet within a country than it is between countries. In practice, the main constraint in producing subnational PPPs is obtaining the detailed values for product groups in each region that are required to compile real expenditures (and their per capita equivalents) for expenditure groups and to weight together the component PPPs into PPPs for total regional expenditures. On the other hand, comparing relative price levels between regions in a country is easier than between countries⁵ because there are no exchange rates involved when regions within a country are being compared.

⁵ In ICP, the price level index is expressed as the price level of a given country relative to another by dividing the PPP by the market exchange rate relative to the base country.

As a result, expenditure values are also required for subnational comparisons even though the values for all regions are expressed in the same currency. Ideally, regional accounts consistent with the national accounts would provide the subnational values. But the required details that are consistent with the details available for overall GDP data are not always available. Therefore, in the case of the Philippines, the regional data from the FIES were used to provide the values. In instances where the FIES did not provide values at a sufficiently detailed level, the CPI weights for the relevant categories were used to impute expenditure values for the basic headings involved by splitting the lowest level value in proportion to the CPI weights.

The data from the ICP are important analytical inputs for policy makers, economists, academics, and international organizations. In particular, PPP-based data provide crucial inputs into generating internationally comparable datasets that can be used in analyzing poverty, in determining international poverty lines (IPLs), and in converting an IPL (such as the World Bank's US\$1 per day) into local currencies. Similarly, subnational PPPs can be used to determine poverty lines within a country and compare poverty levels across regions or provinces based on a comparable basket of goods and services.

V. The Philippines CPI

The applicability of the subnational or intracountry PPP compilation is demonstrated in this study by data mining the CPI price information stored in the PNSO's CPI database. It should be noted, however, that the confidentiality of the data was maintained throughout the implementation. This section basically discusses the scope and coverage; and the data structure of the PNSO that satisfies the necessary criteria that allow estimations of PPPs within the country at the regional level.⁶

A. Scope and Coverage

The Philippines is split into 80 provinces and 17 regions. The CPI is compiled for the Philippines as a whole and for each of the 17 regions (including the National Capital Region [NCR], or metropolitan Manila). Explicit weights are used in the CPI at the regional level and for the Philippines as a whole.

Currently, the base year is 2000, which was chosen mainly because it was the year when the FIES was conducted. It was also perceived to be a politically, economically, and socially stable year so that no abnormal events affected the expenditure patterns observed in the FIES. The scope of the FIES is similar to that of the CPI and so it provides a comprehensive and coherent data source for the expenditures used to

⁶ See NSO (2011) for detailed notes on the rebasing of the CPI from 1994 to 2000.

calculate the CPI weighting patterns. The 2000 FIES was conducted nationwide, and covered 41,000 households. Details were available for each province/city so weights could be calculated at this very detailed level to distinguish the different consumption patterns in different geographical locations. The weight for each product group (i.e., Cereals and cereal preparations) is effectively the percentage of expenditure on that product group to the total expenditure on all products. Similarly, provincial expenditures were aggregated into regions. The weight of each region was expressed as a share of the expenditures in the Philippines as a whole. In practice, a matrix of weights was constructed (product group by region) that enabled weights to be aggregated across either a product group or a geographical dimension. As a result, the weights enable the CPI itself to be aggregated into product groups by regions with the broadest level being “all products” for the Philippines as a whole.

B. Data Structure

1. Basket of Products and Broad Classification

The “basket of products” included in the CPI is a sample of goods and services that are commonly purchased by Filipino households. It varies by province and by region to reflect differences in the provincial/regional availability and popularity of products. The number of individual products included in the basket ranges from 286 in the province of Batanes to 753 in Negros Occidental. The NCR’s⁷ basket contains 716 products and its weight accounts for just over 30% of the Philippines’ total. Prices for the individual products are weighted together to generate price indexes for broad groups, including a total for all products, within each of the 17 regions and for the Philippines as a whole. The top two levels of the CPI classification comprise six main groups and 28 subgroups (Table 1).

⁷ Note that the National Capital Region is considered both as region and a province considering its geographic and economic size.

Table1: Consumer Price Index Classification by Major Groups and Subgroups

Code	Major Group/Subgroup
1	Food, beverages and tobacco
11	Cereals and cereal preparations
12	Dairy products
13	Eggs
14	Fish
15	Fruit and vegetables
16	Meat
17	Miscellaneous foods
18	Beverages
19	Tobacco
2	Clothing and footwear
20	Clothing
21	Footwear
22	Ready-made apparel, except footwear
23	Custom clothes (accessories and services)
3	Housing and repairs
31	Minor repairs
32	Rentals
4	Fuel, light and water
41	Fuel
42	Light
43	Water
5	Services
51	Educational services
52	Medical services
53	Personal services
54	Recreational services
55	Transportation and communication
56	Other services
6	Miscellaneous
61	Household furnishing and equipment
62	Household operations
63	Personal care and effects
64	Other miscellaneous goods
	Total (All groups)

Source: National Statistics Office (2000).

Based on the 2000 FIES, Food, beverages and tobacco is the most important group, accounting for 50.0% of the expenditure weight, with Food alone having a weight of 46.6%. Other large groups are Housing and repairs (16.8%) and Services (15.9%). However, these averages mask some significant regional differences. For example, Food has only 37.6% of the expenditure weight in the NCR, while the NCR's weight for Housing and repairs (24.6%) is much higher than the Philippines' average.

2. Price Quotations

The monthly CPI is based on about 459,000 price quotations collected throughout the country. The prices are collected from a sample of outlets, selected on the basis

of their importance in sales of the products to be priced and on the consistency and completeness of the stock of those products. In practice, the outlets sampled should sell a number of products included in the CPI and they should be patronized by a significant number of consumers purchasing those products. In addition, the outlet should have a regular stock of those products included in the CPI product list and should be an established store or market stall (i.e., transient vendors are excluded).

3. Base/Reference Year and Sources of Weights

The CPI on a 2000 base year was first published in October 2002, replacing the 1994-based series that was introduced in 1996. Over time, consumers change their expenditure patterns in response to differential price changes (e.g., switching between types of meat as one becomes relatively more expensive than the other). In addition, preferences change as income levels change. For example, a typical outcome of increasing incomes is a lower share of overall expenditure going to food.

The weights of the CPI are always lagging the current situation because of the cost and time involved in obtaining the data to update the weights. On the other hand, the amount of resources required for the conduct of major surveys (such as the FIES) is even greater, which means that they can be undertaken only infrequently (which is once every 3 years) and whose final results are obtained 2 years after the reference year. In addition, once the results are available it takes time to use them to update the CPI weights. For purposes of this paper, the 2000-based CPI was used in lieu of the unavailable final estimates/results of the 2006-based CPI at the implementation stage of the study.

4. Regular CPI Aggregation Methodology

The Laspeyres fixed-base formula (or a variant called the Lowe index) is commonly used by national statistical offices to calculate official price indexes such as the CPI, producer price indexes, and export and import price indexes. The Laspeyres formula uses as weights the relative expenditures on the various products comprising the regimen of the price index. Weighting data, as mentioned earlier, are expensive to obtain and are usually available only some time after their reference period because it is necessary to conduct surveys to obtain the details. The Laspeyres formula generally leads to an upward bias in the price indexes because it does not allow for substitution between similar types of products as the prices of one rise relative to those of the other (ILO 2004). For example, if the price of beef increases while that of chicken remains the same, consumers are likely to switch part of their expenditure from beef to chicken. Because the Laspeyres price index has fixed weights it does not allow for this substitution until the next time the weights are updated and so the price increase recorded for meat is high.

In the Philippines, the formula in computing the CPI is the weighted arithmetic mean of price relatives, a variant of the Laspeyres formula with fixed base year period weights as expressed in the formula below:

$$CPI = \frac{\sum[(P_n / P_o)W]}{\sum(W)} \times 100 \quad (1)$$

where: P_n = current price
 P_o = base period price
 $W = P_o Q_o$ = weights

Like in most countries, the main purpose of the CPI is to capture temporal movements of prices and hence, inflation rate in the Philippines is defined as the annual rate of change, or the year-on-year change in the CPI, that is,

$$INFLATION\ RATE = \frac{CPI_2 - CPI_1}{CPI_1} \times 100 \quad (2)$$

where: CPI_2 = CPI in the second period
 CPI_1 = CPI in the previous period

VI. Estimation Methodology: Subnational PPP

The current study is designed to compare prices for exactly the same products among regions within the Philippines. Estimation and analysis were done at the regional level. While the FIES sampling design—the main source for obtaining the values or expenditures used in the subnational PPP calculation—uses the province as the domain, this paper limits its analysis to the 17 regions enumerated in Table 2 below with corresponding regional and country populations in 2010.

Table 2: Population of the Philippines, by Region, 2010

Region Code	Region Name	Population
Region I	Ilocos Region	5,172,900
Region II	Cagayan Valley	3,365,400
Region III	Central Luzon	10,159,300
Region IV-A	CALABARZON	11,904,100
Region IV-B	MIMAROPA	3,018,000
Region V	Bicol Region	5,711,500
Region VI	Western Visayas	7,578,000
Region VII	Central Visayas	7,029,300
Region VIII	Eastern Visayas	4,447,500
Region IX	Zamboanga Peninsula	3,487,400
Region X	Northern Mindanao	4,349,300
Region XI	Davao Region	4,362,400
Region XII	SOCCKSARGEN	4,080,400
Region XIII	Caraga	2,549,400
ARMM	Autonomous Region in Muslim Mindanao	3,551,800
CAR	Cordillera Administrative Region	1,694,400
NCR	National Capital Region	11,552,100
PHI	Philippines	94,013,200

Sources: 2000 Census-based Population Projections in collaboration with the Inter-Agency Working Group on Population Projections, National Statistics Office, available: www.census.gov.ph/data/sectordata/popproj_tab3r.html.

To effectively implement the ICP concepts in national context, the single most important criterion is to obtain a set of prices for products that must be identical so that their price relativities are not distorted by being between dissimilar products. In the ICP this characteristic is referred to as “comparability”. In the *2003-2006 ICP Handbook* (World Bank 2007b, 15–6) it is defined as follows: Two, or more, products are said to be comparable either:

- (i) if their physical and economic characteristics are identical, or
- (ii) if they are sufficiently similar that consumers are indifferent between them. Two similar products is said to be comparable if consumers are indifferent as to which of the two they consume. This implies that consumers are not prepared to pay more for one than the other.

In constructing subnational PPPs, there are three major considerations: (i) The organization of the data for computing subnational PPP, (ii) the determination of the overlapping products; and (iii) subnational aggregation.

A. Organization of Data for Computing Subnational PPPs

There is no standard structure for a prices database, with NSOs adopting procedures that best suit their own needs. Often, they are driven by the computer systems used to compile a CPI, which are a function of the computing environment in each national statistical office. Extracting data in the format required for calculating average prices for each product can be a time-consuming process, which depends on the data structure, the data descriptors, and the availability of programs to extract the prices in the format required to be able to average them within each region.

The PNSO was able to extract prices data relatively easily, as each product in the CPI basket carries a unique product code and is identifiable across regions. This facilitated converting them into average prices for each product in each region and copying them into a special database for the subnational comparisons. The output (database) was examined closely, with the first stage essentially being a manual exercise to identify those products whose average prices could be compared directly across regions. The process involved ensuring that products that appeared to be the same were actually identical in practice, and that the average prices were not unduly influenced by differences in key characteristics, with the size of the packages or containers being particularly important. For example, an average price for “soft drinks” would include containers ranging from 300 milliliters (ml) to 1.5 liters, which could distort the average prices even after they were converted to unit price, because the price per unit of quantity is much lower for large soft drink bottles than for smaller ones. In such cases, it was necessary to split the category into two or more product groups (e.g., soft drink containers of 600 ml or less and those greater than 600 ml).

The average prices extracted from the CPI database were the main inputs but, as is the case with international comparisons, expenditure values were also required so that the PPPs for individual products could be aggregated into those for broader product groups. The aim was to have values available for each region at the most detailed level. In the Philippines, national accounts household disposable income data are not readily available at the required level of detail. Therefore, regional data from the FIES were used to provide the values and hence, the analysis should be limited to household income and expenditure and not to the entire GDP as in the case of ICP. While the FIES contains sufficiently detailed data to enable expenditures on broad product groups to be estimated, it was generally not possible to calculate basic heading values, which is the lowest level of classification in the ICP. Hence, subnational PPPs were estimated at higher level aggregates.

B. Determining Product Overlaps

As is the case for international comparisons, another characteristic required for subnational comparisons is representativity. One of the criteria for selecting products in computing subnational PPPs is that they should be representative of consumers' purchases. The "national" CPI basket is supposed to capture this characteristic and therefore, need not be considered further in this case study since all products in the CPI can be considered to be representative. However, as mentioned in Section IVB, each area (province/region) has its own "regional" basket that represents its regionally purchased or consumed items and reflects its consumption pattern. Hence, it was essential to determine which of the list of regional representative products are being priced by at least two regions to establish overlap. In cases of sparse datasets, PPP calculation may still not be possible even when binaries are established. It is necessary, therefore, to establish at which level the binary combinations and their transitivity will be apparent and will yield more robust and realistic PPPs. These imply that the process of subnational comparisons using CPI data is not completely straightforward.

The basket of goods and services priced for the CPI remains relatively stable in the short to medium term because the main aim of the CPI is to compare prices over time. The changes that do occur are to replace products that are no longer available and to introduce new products that were not previously available. For example, when the CPI was updated from a 1994 to a 2000 base year, 68.4% of the products in the NCR were retained while 31.6% of the products were changed. The price specifications for the CPI in different locations within the country are broadly similar as far as the coverage of products is concerned but the exact specifications can differ among regions to take account of local conditions (e.g., package sizes may not be the same in different regions or the varieties of a product may be different). As a result, some problems arise when the CPI data are used in comparing subnational price levels.

Handling some of these problems is relatively straightforward. Different package sizes can be adjusted to a unit price, provided that the package sizes are relatively similar (e.g., a 300 gram packet could be compared with a 250 gram packet of the same product on the basis of price per 100 grams, but a 250 gram packet would be considered a different product from a 500 gram one). A more difficult problem arises when different varieties of the same product are sold in different regions. For example, consider three different brands of coffee that are considered to be of different qualities. In region 1, brand A and brand B are sold, while in region 2 all three brands are included in the CPI, but only brand C is priced in region 3. The regional availability of the different brands is illustrated in Table 2.

Table 3: Example for Identifying Product Overlap

Coffee	Region 1	Region 2	Region 3	Assessment
Brand A	Priced	Priced		Include
Brand B	Priced			Exclude
Brand C		Priced	Priced	Include

Source: Authors' illustration.

In this example, it is clear that coffee prices cannot be directly compared between region 1 and region 3 because none of the brands is common to both regions. It is possible, though, to compare brand A directly between regions 1 and 2 and to compare brand C directly between regions 2 and 3. The process in such cases is to include all the possible matches when making the comparison. In the above example, brand A would be compared between regions 1 and 2 and brand C would be compared between regions 2 and 3. Region 2, in which brands A and C were priced, provides a link between coffee prices in regions 1 and 3. In the meantime, brand B will be dropped from the subnational comparison as it was priced only in region 1.

The above example of coffee brands being priced in different regions assumes that the same products are being specified in the same way in each region. In practice, some products have a common specification across all regions, which provide a firmer basis for subnational comparisons. However, the specifications for some products may not be identical in the different regions because of the options given to price collectors to determine exactly which product is to be priced, within a broad set of parameters. The greater the extent of national (or at least multiregional) specifications for products, the easier it is to compare price levels among regions.

In the Philippines CPI, different numbers of products are priced in different regions, with the number of individual products included in the basket ranging from a low of 286 products in Batanes to a high of 753 in Negros Occidental (Manila's basket contains 716 products). There is a large degree of product overlap among the regions even though, to some extent, the provinces specified their own market baskets in the 2000 CPI. Given the distinct consumption patterns of each of the region, the number of products in the Philippines' CPI basket totalled 11,174. However, in lieu of the basic criterion for inclusion in the subnational PPP—that is, the product must be priced by at least two regions—only a total of 3,401 items or about 30% of the total CPI products for the entire Philippines is included in the computations.

C. Subnational PPP Aggregation

After organizing the price and weights data and determining the product overlaps comes the estimation of subnational PPP at different levels that include elementary and higher level aggregation.

1. Elementary Index Aggregation

Calculation of the lowest level price relatives is called elementary aggregation. At that level, all aggregation is done unweighted. This is the product level in the CPI and the basic heading level in the ICP calculation. In this study, the Country-Product-Dummy (CPD) index is used in elementary aggregation. Currently, the elementary aggregation is conducted at the 2-digit level (28 subgroups/categories). The 3-digit level aggregation (85 categories) is planned for the future.

The basic dataset for the CPD calculation was a matrix of prices for all priced products within each region. Obviously, there were gaps in the matrix because it was not possible to obtain prices in every region for every product due to the unavailability of some products in some regions and variations in the number of products priced across regions. The underlying model for the CPD is multiplicative and assumes that prices vary by product within regions at the same rate across all regions, and that prices vary among regions at the same rate across all products.

The CPD index is normally used in international (spatial) comparisons; however, for this study the CPD for the combined spatial and temporal elementary aggregation was used. The CPD index, first introduced by Summers (1973) can be presented in two equivalent forms, with intercept and without. The regression equation for the CPD can be written as:

$$\ln p_{cp} = y_{cp} = x_{cp}\beta + \varepsilon_{cp} \quad (3)$$

where p_{cp} = price of product p in country c

Dc_j and Dp_i = country and product dummies

Np and Nc = number of products and countries, respectively.

$$x_{cp} = [Dc_2 \dots Dc_{Nc} Dp_1 Dp_2 \dots Dp_{Np}]$$

$$\beta = [\alpha_2 \dots \alpha_{Nc} \gamma_1 \gamma_2 \dots \gamma_{Np}]^T \quad (4)$$

In matrix notation, by stacking individual observations, this can be written as:

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\varepsilon} \quad (5)$$

Note that the first country dummy is dropped from the system because matrix X is of rank $(Np+Nc-1)$.⁸ In fact, any variable from the system can be dropped, and dropping the first country's dummy simply makes it the base country.

⁸ The sum of country dummies equals the sum of product dummies, so one dummy has to be dropped.

The solution is given (under the conditions of independently and identically distributed random disturbances) by:

$$\hat{\beta} = (\mathbf{X}^T \mathbf{X})^{-1} \mathbf{X}^T \mathbf{y} \quad (6)$$

In addition, one product variable (say the first product dummy) can be dropped and an intercept can be introduced. This is the second form of the CPD. In this case⁹

$$\begin{aligned} \mathbf{x}'_{cp} &= [Dc_2 \dots Dc_{Nc} \ 1 \ Dp_2 \dots Dp_{Np}] \\ \beta' &= [\alpha'_2 \dots \alpha'_{Nc} \ c_{\text{intercept}} \ \gamma'_2 \dots \gamma'_{Np}]^T \end{aligned} \quad (7)$$

$$\mathbf{y} = \mathbf{X}'\beta' + \boldsymbol{\varepsilon} \quad (8)$$

The solutions of equations (5) and (8) are on the country and product price relatives that are identical up to a scalar in these two cases. In the case with intercept,

$$\begin{aligned} \alpha_j &= \alpha'_j \\ \gamma_1 &= c_{\text{intercept}} \\ \gamma_i &= \gamma'_i + c_{\text{intercept}}, \\ \text{for } i &= 2 \dots Np, j = 2 \dots Nc \end{aligned} \quad (9)$$

where γ'_i and α'_j are the product coefficients for product i and country j , respectively, in the case with intercept.

One useful output from the CPD model is a set of estimated prices for each product for each region. These prices provide an estimate of what the prices would be if the relationships set out in the model held in practice. The differences between observed prices and these modeled prices can provide an indication of possible problems with the prices provided by a region. Large differences indicate possible problems, e.g., because the prices for the same product vary significantly across regions, or because the relativities between prices of products within a region vary significantly compared with those in other regions. Two of the major advantages of the CPD method include estimation of sampling errors for PPPs, and calculation of patterns of residuals that can be used to indicate potential problems with the consistency (or inconsistency) of prices collected by an economy for a particular basic heading.

For this project, the CPD was used as the combined spatial-temporal model. It means that the “country” in the original CPD should be understood as the “country [region] at time period”. Accordingly, the number of “country/region” dummies will be equal to 17, representing the number of regions in the Philippines, multiplied by the number of time

⁹ Note that the sign (') does not mean transpose. Sign (^T) is used for that purpose.

periods [4 (quarters) x 6 (years) = 24 quarters]. This variety of the CPD could be called the Country-Time-Product-Dummy or CTPD.

The CTPD method is a multilateral approach, which means the PPPs are estimated simultaneously for all regions within the Philippines and all time periods. The PPPs generated by the CTPD model are transitive as it basically carries the same principle and concepts as in the usual CPD model. In other words, the measure of the relationship between any pair of regions for a product's PPP is the same no matter whether the regions are compared directly or via a third region within the Philippines. The same characteristic holds for the temporal dimension of the model. In other words, the CTPD puts price levels of all the regions and from all time periods on the same scale, and makes them directly comparable.

2. Higher Level Aggregation: The Index Number Issue

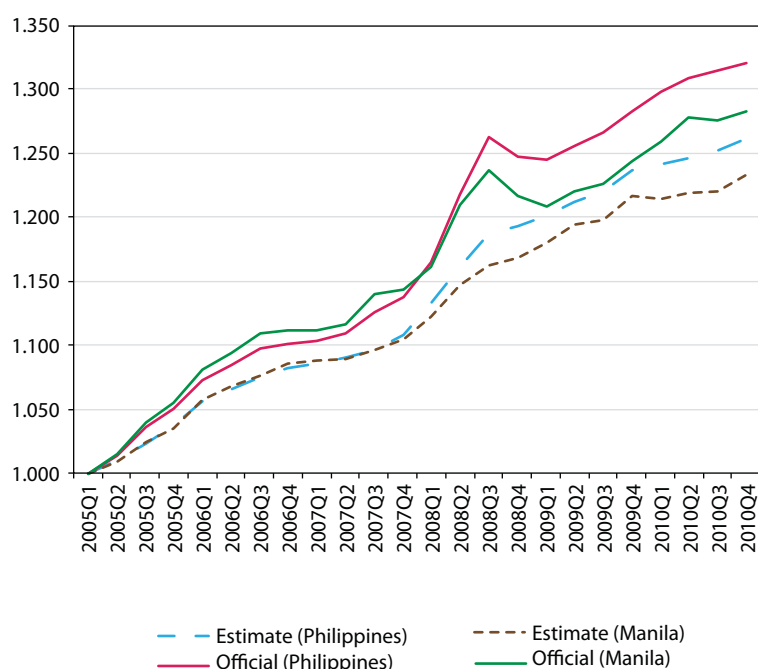
The index number theory recommends chain indexes for the CPI as better approximating the Divisia index. The Divisia index is determined if the prices and quantities can be presented as continuous functions of time. The Divisia index decomposes value (price multiplied by quantity) into two components: price and quantity indexes, respectively. The value is differentiated with respect to time to obtain the two components: a price change and a quantity change. Because in practice prices can be recorded only at discrete intervals, and weights normally can be obtained at even more discrete intervals, only an approximation to the Divisia index can be made. Thus, an annual chain index may be regarded as a discrete approximation to a Divisia index. A variety of index number formulae can be used for this approximation, but usually the Törnqvist or Fisher is recommended as individual chain indexes. For practical reasons, the Laspeyres formula is often used in the chain index, as it could be difficult to estimate the current year's expenditures. Normally, difference between chain Laspeyres and chain Törnqvist or Fisher indexes is rather small, even though the bias from using the Laspeyres index is systematic (accumulating) and is around 0.1%–0.3% per year.

For the current exercise, the initial intention was to use the chain Törnqvist index. However, as previously mentioned, the expenditures weights derived for each major commodity are only available from the FIES, which is conducted once every 3 years. At the time of the study, annual extrapolation of weights from the 2005–2010 periods is still being processed. Hence, for this study, the system of weights from year 2000 was used as a substitute. Even though the substitution effect cannot be incorporated into the calculations, this system of weights is consistent with the one used in the official CPI, and thus is not irrelevant for purposes of this study. Incorporating the weights for years 2006 and 2009 as well as estimating the weights for remaining years through interpolation could be explored in the future. This will allow for the estimation of PPP using the chain Törnqvist index. The current index can be described as the geometric Laspeyres, the weighted geometric average of the current to base period price relatives using the value shares of the base period as weights.

VII. Major Results and Findings of the Study

Results shows that the temporal behavior of price levels derived from the study is quite similar to the official CPI with one important difference: in our time series both regional and national CPIs are lower than the official estimate by up to 3%–4% over the 6-year span (Figure 1). Partially this can be explained by the geometric nature of the index used (the geometric Laspeyres), because the geometric index will be always below the Laspeyres index. However, some further investigation is needed in order to explain the differences in full.

Figure 1: Estimated Quarterly Price Indexes versus Official Consumer Price Index, 2005–2010



Source: Authors' estimates.

The results of the current exercise at the PCE and major aggregates level as well as the aggregates of nonfood groups are provided in graphical and tabular forms in the Appendix Tables. The periods are located on the horizontal axis. The price level is on the vertical axis. The regional price indexes are plotted by quarter, starting from the first quarter (Q1) of 2005 and finishing at Q4 2010. Each region is presented by an individual line. For example, the lowest line in Appendix Table 1 and Appendix Figure 1 corresponds to Region 12 across all quarters from Q1 2005 to Q4 2010. The reference point is the price level in the Philippines in Q1 2005. Thus, the Manila price level in Q1 2005 is 115% of the national price level. Toward the end of the period, in Q4 2010 the national price level stands at 126% of the reference point. Manila price level rises in Q4 2010 to 142%

of the reference point. At the same time, the price level in Region 1 rose from 100% of the reference (the Philippines in Q1 2005) in Q1 2005 to 127% in Q4 2010, remaining virtually identical to the national price level over the period. These numbers indicate that the overall inflation in Region 1 was 27.1%, and in Q4 2010 the price level in region 1 was 10.4% lower than in Manila.

Examining the graphs and tables shows that there are generally large differences in price levels in some regions, with most (but not all) regions having lower price levels than Manila. Nonetheless, the price level in Manila during the period has been generally growing slower than in the Philippines: about 123% versus about 126%, which is consistent with the national CPI. The price level in Manila was 115% of the national level in Q1 2005, and has decreased to 112% of the national level in Q4 2010. However, all the price movements are highly correlated across all regions, which are probably indications of efficiency of the market. An important topic of the future work would be to test these results by incorporating substitution effects of changing expenditure patterns.

There are observed significant differences in overall price levels in the 17 regions, ranging from 14% and below, to 15% and above the national average for PCE. The relatively higher price level in NCR could in part be attributed to the high housing costs. Excluding housing, the price level in Manila was close to the national average, being only 3% above the average in Q4 2010. The price difference can be much higher for individual components.

Income data from the FIES can be used in conjunction with the price levels to indicate some relative standards of living across the regions. The following table shows the regions in order of their per capita incomes, both in nominal and real terms. Note that the small differences are unlikely to be significant because the standard errors in the FIES data are much larger at the regional level than for the Philippines as a whole.

One of the aims of this study is to determine whether it would be possible to use information on differences in regional price levels to adjust the price levels in a major region to annual national average prices and so avoid having to collect prices in all regions for the ICP. It seems that there is generally high consistency between the results of the current exercise and ICP 2005 in terms of the capital city price levels. In the ICP, the price level of Manila for the so-called shop items was found to be about 3% higher than the national average, which is quite consistent with our estimate for similar items (3%–4%).

Table 4: Per Capita Expenditures, Philippines Nominal and Real (Philippines = 1.0)

Major Group/Region	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	RMM	CARAGA	R4B	PHI
Nominal Relative Expenditures																		
Personal Consumption Expenditure	2.30	0.84	0.81	0.96	1.10	0.81	0.82	0.71	0.64	0.59	0.70	0.77	0.67	0.98	0.38	0.61	0.68	1.00
Food, Beverages and Tobacco	1.85	0.93	0.96	1.02	1.10	0.92	0.88	0.78	0.74	0.69	0.76	0.83	0.75	1.00	0.48	0.72	0.76	1.00
Nonfood	2.75	0.75	0.65	0.90	1.11	0.70	0.76	0.64	0.55	0.48	0.64	0.72	0.58	0.95	0.28	0.51	0.60	1.00
Clothing and Footwear	1.98	1.05	0.87	1.00	1.08	0.77	0.94	0.60	0.51	0.60	0.86	0.92	0.86	0.97	0.45	0.69	0.86	1.00
Housing and Repairs	3.37	0.60	0.55	0.78	1.02	0.60	0.65	0.62	0.49	0.41	0.54	0.58	0.42	0.96	0.24	0.38	0.54	1.00
Fuel, Light, and Water	2.33	0.86	0.76	1.06	1.15	0.76	0.79	0.68	0.63	0.53	0.72	0.69	0.62	0.91	0.34	0.59	0.61	1.00
Services	2.79	0.75	0.63	0.89	1.19	0.68	0.75	0.63	0.50	0.45	0.61	0.75	0.57	0.97	0.17	0.46	0.53	1.00
Miscellaneous Items	1.96	0.85	0.76	0.99	1.13	0.85	0.90	0.68	0.70	0.62	0.80	0.91	0.84	0.94	0.47	0.74	0.79	1.00
Real Relative Expenditures																		
Personal Consumption Expenditure	2.01	0.85	0.90	0.95	1.14	0.85	0.90	0.75	0.72	0.66	0.80	0.89	0.74	1.00	0.43	0.65	0.70	1.00
Food, Beverages and Tobacco	1.71	0.93	1.02	0.98	1.06	0.95	0.95	0.81	0.84	0.77	0.82	0.92	0.81	0.96	0.52	0.74	0.72	1.00
Nonfood	2.26	0.80	0.80	0.93	1.21	0.76	0.85	0.70	0.62	0.57	0.80	0.88	0.69	1.05	0.36	0.58	0.70	1.00
Clothing and Footwear	1.76	1.14	1.01	1.04	1.07	0.78	1.01	0.60	0.52	0.61	0.93	0.98	0.97	1.00	0.47	0.76	0.85	1.00
Housing and Repairs	2.02	0.82	0.97	1.05	1.44	0.89	0.95	0.77	0.74	0.69	1.13	1.01	0.75	1.32	0.62	0.64	1.06	1.00
Fuel, Light, and Water	2.41	0.80	0.84	0.92	1.10	0.65	0.81	0.65	0.62	0.53	0.79	0.92	0.75	0.86	0.37	0.73	0.62	1.00
Services	2.62	0.78	0.70	0.89	1.18	0.73	0.79	0.69	0.55	0.52	0.65	0.82	0.62	0.97	0.17	0.47	0.48	1.00
Miscellaneous Items	1.93	0.86	0.82	0.94	1.15	0.81	0.95	0.70	0.70	0.62	0.80	0.94	0.89	0.91	0.47	0.72	0.75	1.00

Source: Authors' estimates.

VIII. Conclusion and Future Directions

The major aim of this study is to look at the plausibility of integrating ICP with the country's CPI and computing subnational PPP using regional prices and expenditure weights from the CPI. As can be seen from the graphs of the regional price levels by product group, the relationships between price levels in each of the 17 regions in the Philippines are reasonably consistent for each product group. The conceptual framework provided by the ICP was used to produce PPPs for each of the 17 regions identified for this report. The outputs will be useful for anyone interested in studying the regional incidence of poverty by enabling the national poverty lines to be adjusted for regional price differences, which are substantial in some cases. They are also useful for studying differences in overall regional standards of living.

Ideally, the expenditure weights should be consistent with the national accounts so that the regional PPPs would be consistent with the national ones produced for the ICP. However, in the absence of such data, the Philippines CPI used data from the FIES for estimating weights. While its scope is not identical to that of the national accounts, it provided reliable regional weights for estimating a regional split of the national estimates of household final consumption expenditure.

Another aim of this study was to find out whether prices collected for the CPI could be used to provide reliable estimates of price levels of a range of products in each region, and if the relationships between these price levels proved to be consistent, then the data collection process for the ICP could be substantially reduced, with consequent cost savings. The process would involve collecting prices for the ICP in a handful of regions (or, at an extreme, only in the National Capital Region) and then use the relationships identified in the CPI price data to adjust those prices to national average prices for the ICP reference year. The key lesson for the ICP is that collection costs could be reduced significantly if the datasets of prices collected for the CPI in each country can be used to adjust prices in one or more of the major cities to national average prices. The current study using data collected for the Philippines CPI has shown that such an approach is feasible, provided that the prices data are classified by region, are defined consistently across regions, and can be easily accessed and manipulated.

The current study was designed to determine the feasibility of using the CPI prices dataset to calculate regional price levels, with the dual aim of providing analysts with data required for regional price level comparisons and studies into the incidence of poverty in different regions, thereby reducing the effort involved in collecting prices for the ICP. The outcome has been very positive, and feedback will be requested from analysts on the usefulness of the various datasets and their suggestions for improvements and/or extensions for data that are currently available.

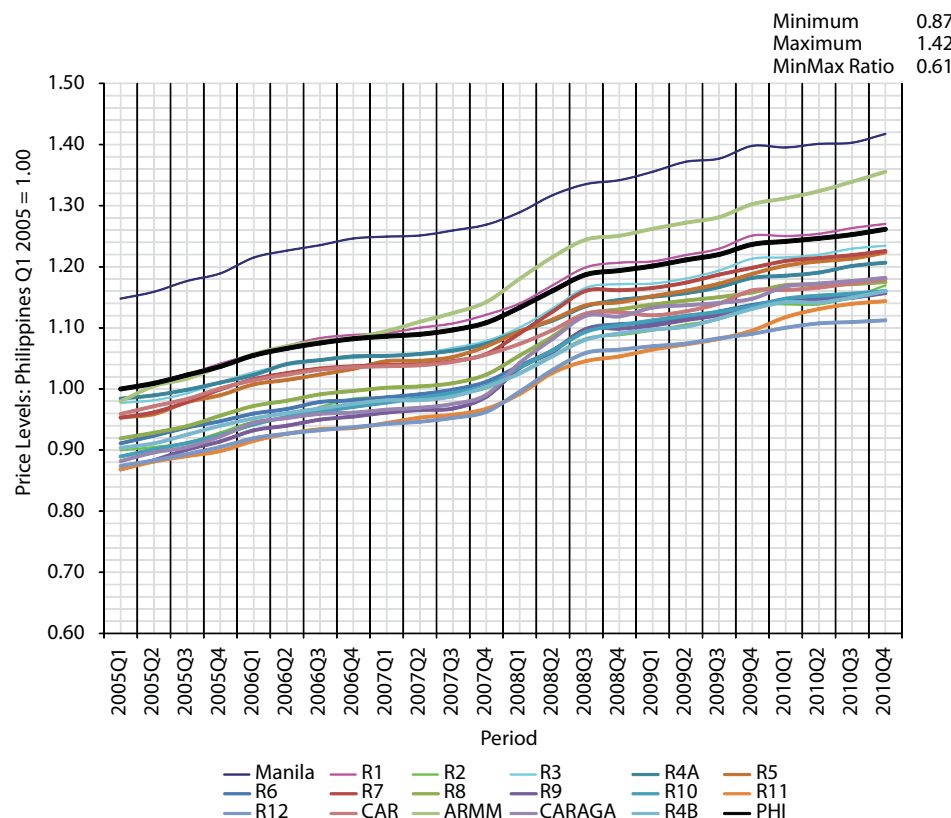
It is clear that improving both the price and expenditure data is an important step in producing more robust regional PPPs. Ideally, the products being priced for the CPI will be selected so that they overlap in different regions and can be easily compared across regions. Regional expenditures consistent with the national accounts are desirable in order to achieve complete consistency between the international data on PPPs (used in compiling poverty lines for countries) and the regional data. Clearly, the FIES is the key dataset in this regard, and studies could be undertaken to determine the best means of matching the expenditure data from the FIES to the countrywide national accounts data for household final consumption expenditure. User requirements for regional PPPs should also be assessed in detail, particularly for poverty analysis.

As described, the current calculation has a number of limitations, which are planned to be addressed in the next stage of this work. These limitations include the following.

- (i) Currently, the elementary aggregation is conducted at the 2-digit level (28 subgroups/categories). To improve precision, the 3-digit level aggregation (85 categories) is planned.
- (ii) Incorporating weights for 2006 and 2009 in the calculation, and estimating the weights for remaining years through interpolation, are intended. This will enable the chain Törnqvist index to be used and to account properly for the substitution effect.
- (iii) More work is needed in order to explain the factors of differences between the ADB calculation and the official CPI. In particular, the price data starting from 2000 need to be incorporated into the analysis.
- (iv) The results show that all regional price movements are highly correlated, which is probably an indication of efficiency of the markets. However, the substitution effects cannot be studied right now as the only available expenditure structure is from 2000. Incorporating substitution effects of changing expenditure patterns should improve our understanding of market behavior.

Appendix: Tables and Charts by Major Commodity Groups

Appendix Table 1 and Appendix Figure 1: Personal Consumption Expenditure Quarterly Regional Price Index, 2005–2010

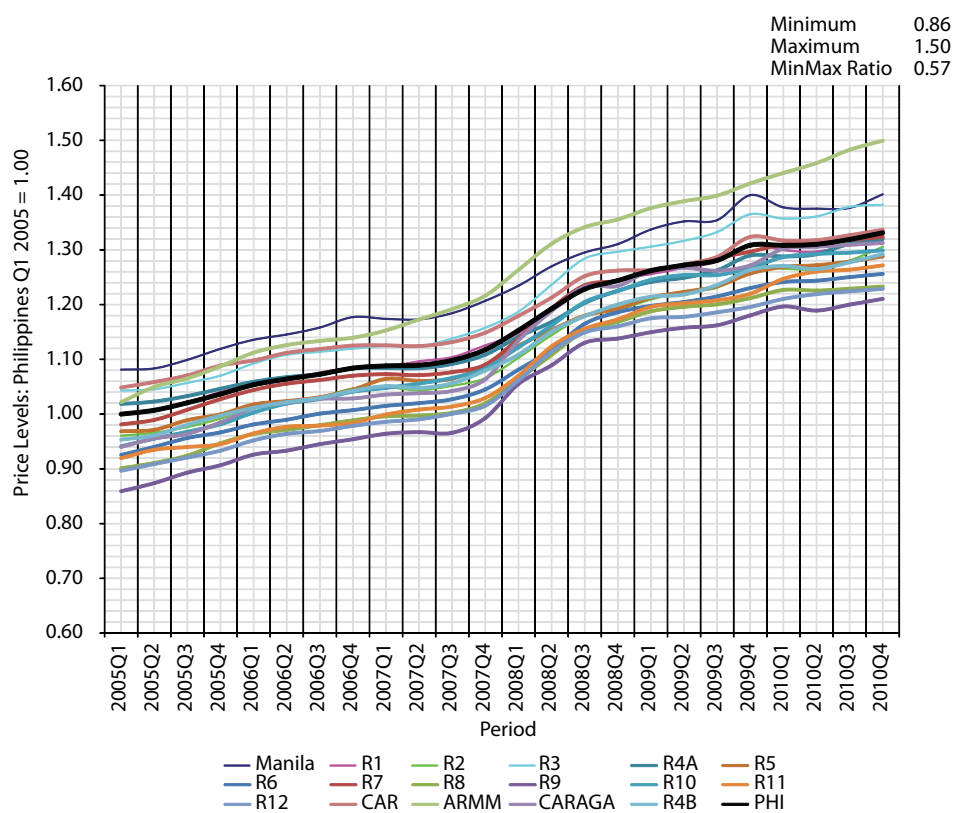


Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.15	1.00	0.90	0.98	0.98	0.95	0.91	0.95	0.92	0.87	0.89	0.87	0.87	0.96	0.98	0.88	0.90	1.00
2005Q2	1.16	1.01	0.90	0.98	0.99	0.96	0.92	0.96	0.93	0.88	0.90	0.88	0.88	0.97	1.00	0.90	0.91	1.01
2005Q3	1.18	1.02	0.91	0.99	1.00	0.98	0.94	0.98	0.94	0.90	0.91	0.89	0.89	0.98	1.02	0.90	0.93	1.02
2005Q4	1.19	1.04	0.93	1.01	1.01	0.99	0.95	1.00	0.96	0.91	0.92	0.90	0.91	1.00	1.04	0.92	0.94	1.04
2006Q1	1.21	1.06	0.95	1.03	1.02	1.01	0.96	1.02	0.97	0.93	0.94	0.92	0.92	1.01	1.06	0.94	0.95	1.05
2006Q2	1.23	1.07	0.95	1.04	1.04	1.01	0.97	1.03	0.98	0.94	0.95	0.93	0.93	1.02	1.07	0.95	0.96	1.07
2006Q3	1.24	1.08	0.97	1.05	1.05	1.02	0.98	1.03	0.99	0.95	0.96	0.93	0.93	1.03	1.08	0.96	0.97	1.08
2006Q4	1.25	1.09	0.98	1.05	1.05	1.03	0.98	1.04	1.00	0.95	0.97	0.94	0.94	1.04	1.08	0.96	0.98	1.08
2007Q1	1.25	1.09	0.99	1.05	1.05	1.05	0.99	1.04	1.00	0.96	0.98	0.94	0.94	1.04	1.09	0.97	0.98	1.09
2007Q2	1.25	1.10	0.98	1.06	1.06	1.05	0.99	1.04	1.00	0.97	0.99	0.95	0.95	1.04	1.11	0.97	0.98	1.09
2007Q3	1.26	1.11	0.99	1.07	1.06	1.05	1.00	1.05	1.01	0.97	0.99	0.96	0.95	1.04	1.12	0.98	0.99	1.10
2007Q4	1.27	1.12	1.00	1.08	1.07	1.07	1.01	1.06	1.02	0.99	1.01	0.97	0.96	1.06	1.14	0.99	1.00	1.11
2008Q1	1.29	1.14	1.03	1.10	1.09	1.09	1.04	1.09	1.05	1.03	1.04	0.99	1.00	1.07	1.18	1.04	1.03	1.13
2008Q2	1.32	1.17	1.06	1.13	1.11	1.11	1.06	1.13	1.09	1.06	1.06	1.03	1.03	1.10	1.22	1.08	1.05	1.16
2008Q3	1.34	1.20	1.08	1.17	1.14	1.14	1.10	1.16	1.12	1.10	1.09	1.05	1.06	1.12	1.24	1.12	1.08	1.19
2008Q4	1.34	1.21	1.09	1.17	1.15	1.14	1.11	1.16	1.13	1.10	1.10	1.05	1.06	1.13	1.25	1.12	1.09	1.19
2009Q1	1.36	1.21	1.10	1.17	1.15	1.15	1.11	1.17	1.14	1.10	1.11	1.06	1.07	1.12	1.26	1.13	1.10	1.20
2009Q2	1.37	1.22	1.11	1.18	1.16	1.16	1.12	1.17	1.14	1.11	1.12	1.07	1.07	1.13	1.27	1.14	1.10	1.21
2009Q3	1.38	1.23	1.11	1.19	1.17	1.17	1.13	1.19	1.15	1.12	1.13	1.08	1.08	1.14	1.28	1.14	1.12	1.22
2009Q4	1.40	1.25	1.14	1.21	1.18	1.19	1.14	1.20	1.16	1.13	1.14	1.10	1.09	1.16	1.30	1.15	1.13	1.24
2010Q1	1.40	1.25	1.14	1.22	1.19	1.20	1.15	1.21	1.17	1.15	1.15	1.12	1.10	1.16	1.31	1.17	1.14	1.24
2010Q2	1.40	1.25	1.14	1.22	1.19	1.21	1.15	1.21	1.17	1.14	1.15	1.13	1.11	1.17	1.32	1.17	1.14	1.25
2010Q3	1.40	1.26	1.15	1.23	1.20	1.21	1.15	1.22	1.17	1.15	1.16	1.14	1.11	1.17	1.34	1.18	1.15	1.25
2010Q4	1.42	1.27	1.17	1.23	1.21	1.22	1.16	1.23	1.18	1.16	1.16	1.14	1.11	1.18	1.36	1.18	1.16	1.26

Source: Authors' estimates.

**Appendix Table 2 and Appendix Figure 2: Food, Beverages, and Tobacco
Quarterly Regional Price Index, 2005–2010**

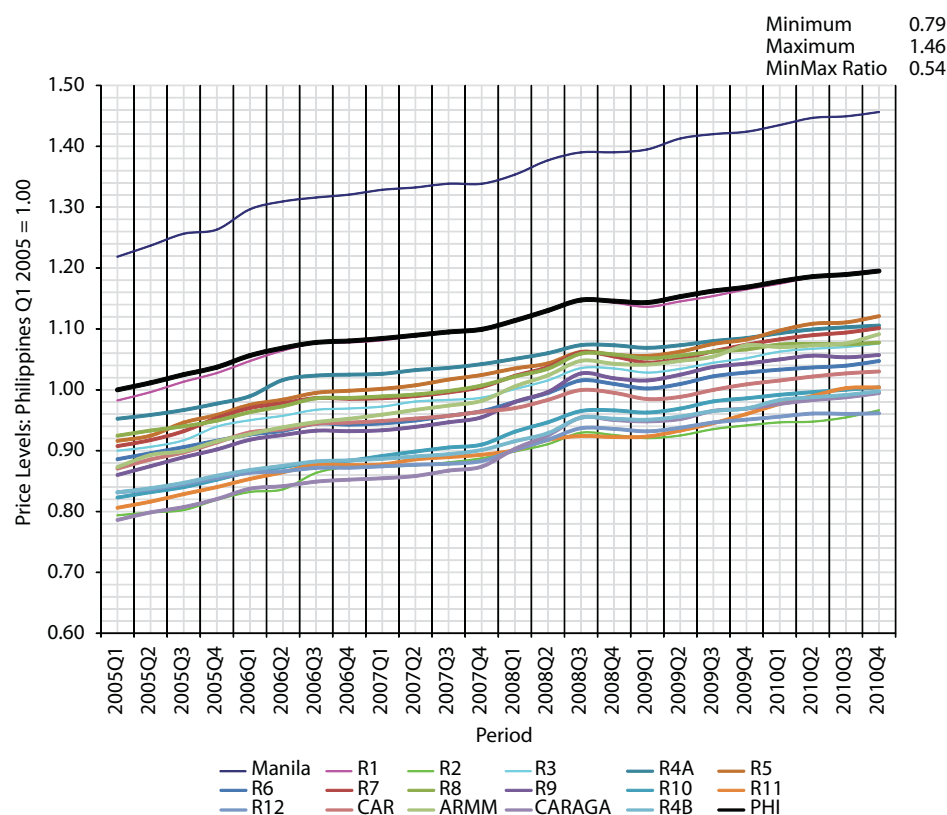


Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.08	1.00	0.96	1.04	1.02	0.97	0.93	0.98	0.90	0.86	0.94	0.92	0.90	1.05	1.02	0.94	0.95	1.00
2005Q2	1.08	1.01	0.97	1.05	1.02	0.97	0.94	0.99	0.91	0.87	0.96	0.93	0.91	1.06	1.05	0.96	0.96	1.01
2005Q3	1.10	1.02	0.98	1.06	1.03	0.99	0.96	1.01	0.92	0.89	0.97	0.94	0.92	1.07	1.07	0.96	0.98	1.02
2005Q4	1.12	1.04	0.99	1.07	1.05	1.00	0.97	1.03	0.95	0.91	0.98	0.95	0.93	1.09	1.09	0.98	1.00	1.04
2006Q1	1.14	1.05	1.01	1.09	1.06	1.02	0.98	1.04	0.96	0.93	1.00	0.96	0.95	1.10	1.11	1.01	1.01	1.05
2006Q2	1.15	1.06	1.02	1.11	1.07	1.02	0.99	1.06	0.97	0.93	1.02	0.98	0.96	1.11	1.13	1.02	1.02	1.06
2006Q3	1.16	1.08	1.03	1.11	1.07	1.03	1.00	1.06	0.98	0.95	1.03	0.98	0.97	1.12	1.13	1.03	1.03	1.07
2006Q4	1.18	1.08	1.05	1.12	1.08	1.04	1.01	1.07	0.99	0.95	1.04	0.98	0.98	1.13	1.14	1.03	1.04	1.08
2007Q1	1.17	1.09	1.05	1.12	1.08	1.06	1.02	1.07	1.00	0.96	1.05	1.00	0.99	1.13	1.15	1.04	1.05	1.09
2007Q2	1.17	1.10	1.04	1.12	1.08	1.06	1.02	1.07	1.00	0.97	1.06	1.01	0.99	1.12	1.17	1.04	1.05	1.09
2007Q3	1.18	1.10	1.05	1.14	1.09	1.06	1.03	1.08	1.00	0.97	1.07	1.01	1.00	1.13	1.19	1.04	1.06	1.10
2007Q4	1.21	1.13	1.07	1.16	1.11	1.09	1.05	1.09	1.02	0.99	1.08	1.03	1.02	1.15	1.22	1.06	1.08	1.12
2008Q1	1.23	1.15	1.10	1.19	1.14	1.12	1.08	1.14	1.06	1.06	1.12	1.07	1.06	1.18	1.26	1.13	1.11	1.15
2008Q2	1.27	1.19	1.14	1.24	1.17	1.15	1.12	1.19	1.11	1.09	1.16	1.12	1.11	1.21	1.31	1.19	1.15	1.19
2008Q3	1.30	1.23	1.18	1.28	1.20	1.18	1.16	1.24	1.15	1.13	1.20	1.16	1.15	1.25	1.34	1.23	1.18	1.23
2008Q4	1.31	1.25	1.19	1.30	1.23	1.19	1.19	1.24	1.17	1.14	1.22	1.17	1.16	1.26	1.36	1.23	1.20	1.24
2009Q1	1.34	1.26	1.21	1.31	1.24	1.21	1.20	1.26	1.19	1.15	1.25	1.20	1.18	1.26	1.38	1.26	1.21	1.26
2009Q2	1.35	1.27	1.22	1.32	1.25	1.22	1.20	1.27	1.20	1.16	1.25	1.20	1.18	1.27	1.39	1.27	1.22	1.27
2009Q3	1.35	1.28	1.23	1.33	1.26	1.23	1.21	1.29	1.20	1.16	1.25	1.21	1.19	1.29	1.40	1.26	1.24	1.28
2009Q4	1.40	1.31	1.27	1.37	1.29	1.26	1.23	1.30	1.21	1.18	1.27	1.22	1.20	1.32	1.42	1.27	1.26	1.31
2010Q1	1.38	1.30	1.27	1.36	1.29	1.27	1.24	1.31	1.23	1.20	1.29	1.25	1.21	1.32	1.44	1.30	1.27	1.31
2010Q2	1.38	1.30	1.26	1.36	1.29	1.27	1.24	1.31	1.23	1.19	1.29	1.26	1.22	1.32	1.46	1.31	1.26	1.31
2010Q3	1.38	1.31	1.28	1.38	1.31	1.28	1.25	1.32	1.23	1.20	1.29	1.26	1.22	1.33	1.48	1.31	1.28	1.32
2010Q4	1.40	1.32	1.31	1.38	1.32	1.29	1.26	1.32	1.23	1.21	1.30	1.27	1.23	1.34	1.50	1.31	1.29	1.33

Source: Authors' estimates.

Appendix Table 3 and Appendix Figure 3: Nonfood Items
Quarterly Regional Price Index, 2005–2010

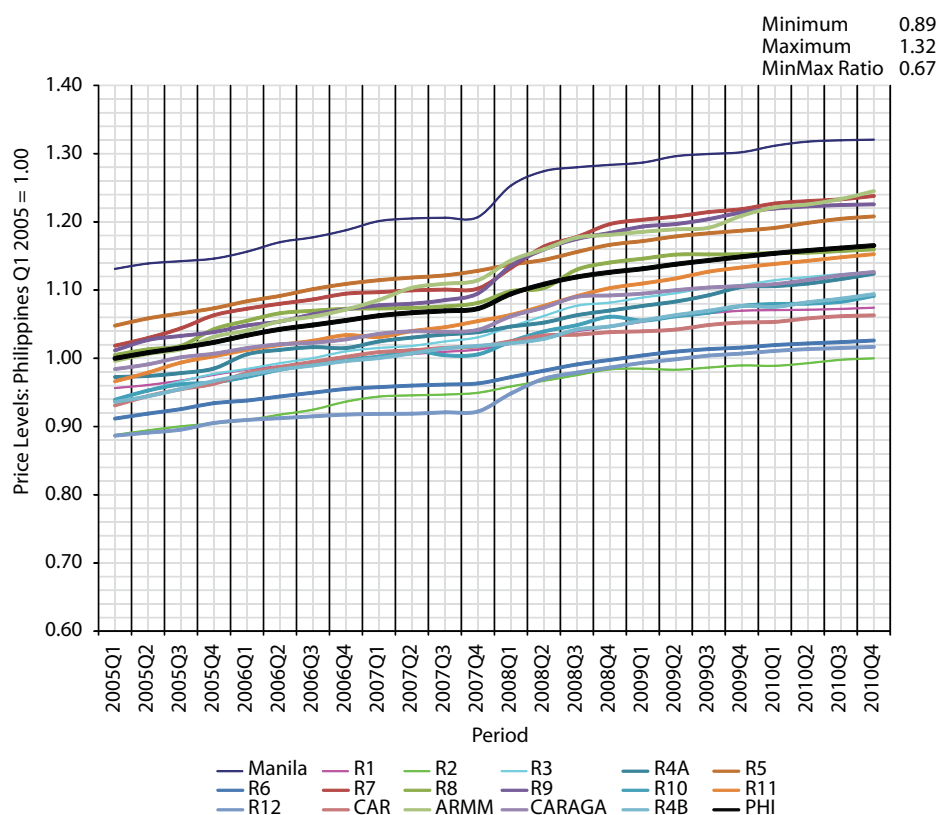


Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.22	0.98	0.79	0.90	0.95	0.92	0.89	0.91	0.92	0.86	0.82	0.81	0.83	0.87	0.87	0.79	0.83	1.00
2005Q2	1.24	1.00	0.80	0.91	0.96	0.92	0.90	0.92	0.93	0.87	0.83	0.82	0.84	0.89	0.89	0.80	0.84	1.01
2005Q3	1.26	1.01	0.80	0.92	0.97	0.95	0.91	0.93	0.94	0.89	0.84	0.83	0.84	0.90	0.90	0.81	0.85	1.03
2005Q4	1.26	1.03	0.82	0.94	0.98	0.96	0.92	0.95	0.95	0.90	0.85	0.84	0.86	0.91	0.92	0.82	0.86	1.04
2006Q1	1.30	1.05	0.83	0.95	0.99	0.98	0.93	0.97	0.96	0.92	0.87	0.85	0.86	0.93	0.93	0.84	0.87	1.06
2006Q2	1.31	1.06	0.84	0.96	1.02	0.98	0.93	0.98	0.97	0.93	0.87	0.86	0.87	0.94	0.94	0.84	0.88	1.07
2006Q3	1.32	1.08	0.86	0.97	1.02	1.00	0.94	0.99	0.99	0.93	0.88	0.88	0.87	0.94	0.95	0.85	0.88	1.08
2006Q4	1.32	1.08	0.87	0.97	1.02	1.00	0.94	0.99	0.99	0.93	0.88	0.88	0.87	0.95	0.95	0.85	0.88	1.08
2007Q1	1.33	1.08	0.87	0.97	1.03	1.00	0.94	0.99	0.99	0.93	0.89	0.88	0.87	0.95	0.96	0.85	0.89	1.08
2007Q2	1.33	1.09	0.88	0.98	1.03	1.01	0.95	0.99	0.99	0.94	0.90	0.89	0.88	0.95	0.97	0.86	0.89	1.09
2007Q3	1.34	1.10	0.88	0.98	1.04	1.02	0.96	1.00	1.00	0.95	0.91	0.89	0.88	0.96	0.97	0.87	0.89	1.10
2007Q4	1.34	1.10	0.89	0.99	1.04	1.02	0.96	1.00	1.01	0.95	0.91	0.89	0.88	0.96	0.98	0.87	0.90	1.10
2008Q1	1.35	1.11	0.90	1.00	1.05	1.04	0.98	1.02	1.02	0.98	0.93	0.90	0.90	0.97	1.01	0.90	0.92	1.11
2008Q2	1.38	1.13	0.91	1.02	1.06	1.04	0.99	1.04	1.03	1.00	0.95	0.92	0.92	0.98	1.02	0.93	0.93	1.13
2008Q3	1.39	1.15	0.93	1.04	1.07	1.06	1.02	1.06	1.06	1.03	0.97	0.92	0.94	1.00	1.05	0.95	0.95	1.15
2008Q4	1.39	1.14	0.93	1.04	1.07	1.06	1.01	1.05	1.06	1.02	0.97	0.92	0.94	1.00	1.04	0.95	0.95	1.15
2009Q1	1.39	1.14	0.92	1.03	1.07	1.06	1.00	1.04	1.05	1.02	0.96	0.92	0.93	0.98	1.04	0.95	0.95	1.14
2009Q2	1.41	1.15	0.93	1.03	1.07	1.06	1.01	1.05	1.06	1.02	0.97	0.93	0.94	0.99	1.05	0.95	0.96	1.15
2009Q3	1.42	1.15	0.94	1.04	1.08	1.08	1.02	1.06	1.06	1.04	0.98	0.95	0.95	1.00	1.05	0.97	0.97	1.16
2009Q4	1.42	1.17	0.94	1.05	1.09	1.08	1.03	1.07	1.07	1.04	0.99	0.96	0.95	1.01	1.07	0.97	0.97	1.17
2010Q1	1.43	1.17	0.95	1.06	1.09	1.10	1.03	1.08	1.07	1.05	0.99	0.98	0.96	1.02	1.07	0.98	0.98	1.18
2010Q2	1.45	1.19	0.95	1.07	1.10	1.11	1.04	1.09	1.08	1.06	1.00	0.99	0.96	1.02	1.07	0.98	0.99	1.19
2010Q3	1.45	1.19	0.95	1.07	1.10	1.11	1.04	1.09	1.07	1.05	1.00	1.00	0.96	1.03	1.08	0.99	0.99	1.19
2010Q4	1.46	1.20	0.97	1.08	1.11	1.12	1.05	1.10	1.08	1.06	1.00	1.00	0.96	1.03	1.09	0.99	1.00	1.20

Source: Authors' estimates.

**Appendix Table 4 and Appendix Figure 4: Clothing and Footwear
Quarterly Regional Price Index, 2005–2010**

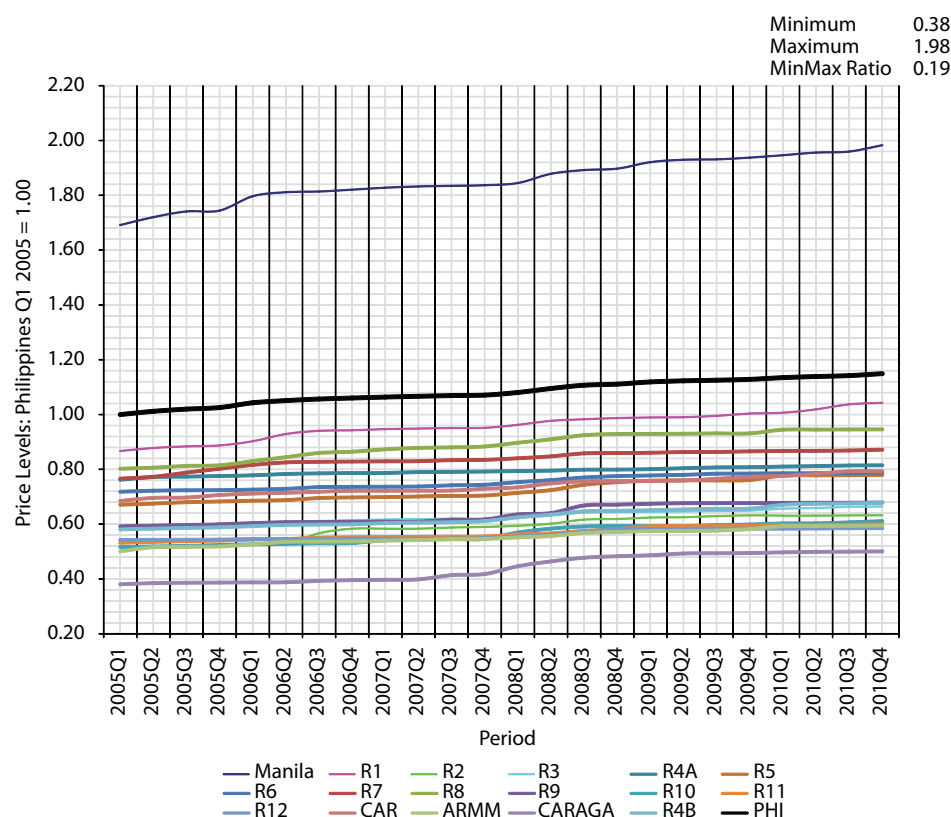


Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.13	0.96	0.89	0.94	0.97	1.05	0.91	1.02	1.00	1.01	0.94	0.97	0.89	0.93	1.00	0.98	0.94	1.00
2005Q2	1.14	0.96	0.89	0.95	0.97	1.06	0.92	1.03	1.01	1.03	0.95	0.98	0.89	0.94	1.01	0.99	0.94	1.01
2005Q3	1.14	0.97	0.90	0.97	0.98	1.07	0.93	1.04	1.02	1.03	0.96	0.99	0.90	0.95	1.01	1.00	0.96	1.02
2005Q4	1.15	0.98	0.90	0.98	0.99	1.07	0.93	1.06	1.04	1.04	0.96	1.00	0.91	0.96	1.03	1.01	0.97	1.02
2006Q1	1.16	0.98	0.91	0.98	1.01	1.08	0.94	1.07	1.06	1.05	0.97	1.01	0.91	0.98	1.04	1.01	0.98	1.03
2006Q2	1.17	0.99	0.92	0.99	1.01	1.09	0.94	1.08	1.07	1.05	0.98	1.02	0.91	0.99	1.05	1.02	0.98	1.04
2006Q3	1.18	0.99	0.92	1.00	1.02	1.10	0.95	1.09	1.07	1.06	0.99	1.03	0.91	0.99	1.06	1.02	0.99	1.05
2006Q4	1.19	1.00	0.94	1.01	1.02	1.11	0.96	1.09	1.07	1.07	1.00	1.03	0.92	1.00	1.07	1.03	1.00	1.06
2007Q1	1.20	1.00	0.94	1.02	1.02	1.11	0.96	1.10	1.07	1.08	1.00	1.03	0.92	1.01	1.09	1.04	1.00	1.06
2007Q2	1.21	1.01	0.95	1.02	1.03	1.12	0.96	1.10	1.07	1.08	1.01	1.04	0.92	1.01	1.10	1.04	1.01	1.07
2007Q3	1.21	1.01	0.95	1.02	1.03	1.12	0.96	1.10	1.08	1.09	1.00	1.05	0.92	1.02	1.11	1.04	1.01	1.07
2007Q4	1.21	1.01	0.95	1.03	1.04	1.13	0.96	1.10	1.08	1.10	1.01	1.05	0.92	1.02	1.11	1.04	1.02	1.07
2008Q1	1.25	1.02	0.96	1.05	1.05	1.14	0.97	1.13	1.10	1.14	1.02	1.06	0.95	1.03	1.14	1.06	1.02	1.09
2008Q2	1.27	1.03	0.97	1.06	1.05	1.14	0.98	1.16	1.10	1.16	1.04	1.08	0.97	1.03	1.16	1.07	1.03	1.11
2008Q3	1.28	1.04	0.98	1.08	1.06	1.16	0.99	1.18	1.13	1.18	1.05	1.09	0.98	1.03	1.18	1.09	1.04	1.12
2008Q4	1.28	1.05	0.98	1.08	1.07	1.17	1.00	1.20	1.14	1.18	1.06	1.10	0.99	1.04	1.18	1.09	1.05	1.13
2009Q1	1.29	1.05	0.98	1.09	1.08	1.17	1.00	1.20	1.15	1.19	1.06	1.11	0.99	1.04	1.19	1.09	1.06	1.13
2009Q2	1.30	1.06	0.98	1.10	1.08	1.18	1.01	1.21	1.15	1.20	1.06	1.12	1.00	1.04	1.19	1.10	1.06	1.14
2009Q3	1.30	1.07	0.99	1.10	1.09	1.18	1.01	1.21	1.15	1.20	1.07	1.13	1.00	1.05	1.19	1.10	1.07	1.14
2009Q4	1.30	1.07	0.99	1.11	1.10	1.19	1.02	1.22	1.15	1.21	1.08	1.13	1.01	1.05	1.21	1.11	1.08	1.15
2010Q1	1.31	1.07	0.99	1.11	1.11	1.19	1.02	1.23	1.15	1.22	1.08	1.14	1.01	1.05	1.22	1.11	1.08	1.15
2010Q2	1.32	1.07	0.99	1.12	1.11	1.20	1.02	1.23	1.15	1.22	1.08	1.14	1.01	1.06	1.23	1.11	1.08	1.16
2010Q3	1.32	1.07	1.00	1.12	1.12	1.20	1.02	1.23	1.16	1.22	1.08	1.15	1.02	1.06	1.23	1.12	1.09	1.16
2010Q4	1.32	1.07	1.00	1.13	1.12	1.21	1.03	1.24	1.16	1.23	1.09	1.15	1.02	1.06	1.25	1.13	1.09	1.17

Source: Authors' estimates.

**Appendix Table 5 and Appendix Figure 5: Housing and Repairs
Quarterly Regional Price Index, 2005–2010**

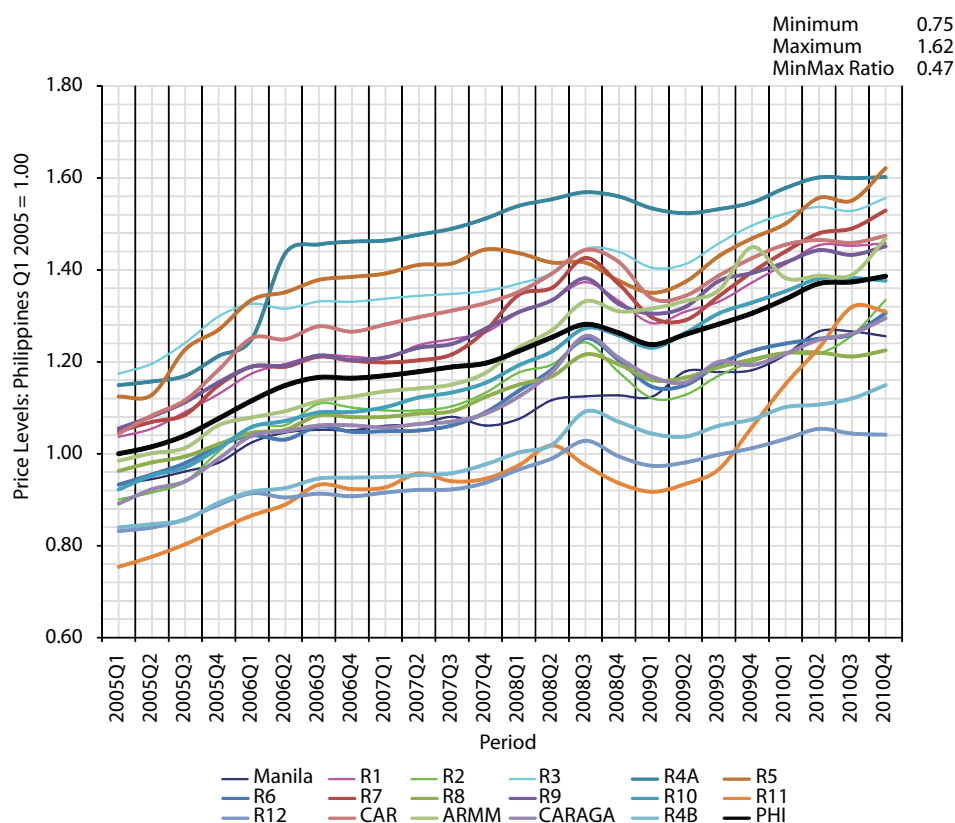


Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.69	0.87	0.51	0.58	0.76	0.67	0.72	0.77	0.80	0.59	0.52	0.53	0.54	0.68	0.50	0.38	0.58	1.00
2005Q2	1.72	0.88	0.51	0.58	0.77	0.68	0.72	0.77	0.81	0.59	0.52	0.54	0.54	0.70	0.52	0.38	0.58	1.01
2005Q3	1.74	0.88	0.52	0.59	0.77	0.68	0.72	0.79	0.81	0.60	0.52	0.54	0.54	0.70	0.52	0.39	0.59	1.02
2005Q4	1.74	0.89	0.52	0.60	0.78	0.68	0.72	0.80	0.81	0.60	0.52	0.54	0.54	0.71	0.52	0.39	0.59	1.03
2006Q1	1.80	0.90	0.52	0.60	0.78	0.69	0.73	0.82	0.83	0.60	0.53	0.54	0.55	0.71	0.53	0.39	0.59	1.04
2006Q2	1.81	0.93	0.53	0.61	0.78	0.69	0.73	0.83	0.84	0.61	0.53	0.55	0.55	0.71	0.54	0.39	0.60	1.05
2006Q3	1.81	0.94	0.57	0.61	0.79	0.70	0.74	0.83	0.86	0.61	0.53	0.55	0.55	0.72	0.54	0.39	0.60	1.06
2006Q4	1.82	0.94	0.58	0.61	0.79	0.70	0.74	0.83	0.86	0.61	0.53	0.55	0.55	0.72	0.54	0.40	0.60	1.06
2007Q1	1.83	0.95	0.58	0.62	0.79	0.70	0.74	0.83	0.87	0.61	0.54	0.55	0.55	0.72	0.54	0.40	0.60	1.06
2007Q2	1.83	0.95	0.58	0.62	0.79	0.70	0.74	0.83	0.88	0.61	0.54	0.55	0.55	0.72	0.54	0.40	0.61	1.07
2007Q3	1.83	0.95	0.59	0.62	0.79	0.70	0.74	0.83	0.88	0.62	0.55	0.55	0.55	0.72	0.55	0.41	0.61	1.07
2007Q4	1.84	0.95	0.59	0.62	0.79	0.70	0.74	0.83	0.88	0.62	0.55	0.56	0.55	0.73	0.55	0.42	0.61	1.07
2008Q1	1.84	0.96	0.59	0.63	0.79	0.71	0.75	0.84	0.90	0.64	0.57	0.56	0.55	0.73	0.55	0.45	0.62	1.08
2008Q2	1.88	0.98	0.60	0.63	0.80	0.72	0.76	0.85	0.91	0.64	0.58	0.57	0.56	0.75	0.56	0.46	0.63	1.10
2008Q3	1.89	0.98	0.62	0.64	0.80	0.74	0.77	0.86	0.92	0.67	0.59	0.58	0.57	0.76	0.57	0.48	0.65	1.11
2008Q4	1.90	0.99	0.62	0.64	0.80	0.75	0.78	0.86	0.93	0.67	0.59	0.58	0.58	0.76	0.57	0.48	0.65	1.11
2009Q1	1.92	0.99	0.62	0.65	0.80	0.76	0.78	0.86	0.93	0.67	0.59	0.59	0.58	0.76	0.57	0.49	0.65	1.12
2009Q2	1.93	0.99	0.63	0.65	0.80	0.76	0.78	0.86	0.93	0.68	0.59	0.59	0.58	0.76	0.57	0.49	0.65	1.12
2009Q3	1.93	1.00	0.63	0.65	0.81	0.76	0.78	0.86	0.93	0.68	0.60	0.59	0.58	0.77	0.58	0.49	0.66	1.13
2009Q4	1.94	1.00	0.63	0.65	0.81	0.76	0.78	0.87	0.93	0.68	0.60	0.59	0.58	0.77	0.58	0.49	0.66	1.13
2010Q1	1.95	1.01	0.63	0.66	0.81	0.78	0.79	0.87	0.94	0.68	0.60	0.60	0.58	0.78	0.59	0.50	0.67	1.13
2010Q2	1.96	1.02	0.63	0.66	0.81	0.78	0.79	0.87	0.95	0.68	0.60	0.60	0.58	0.78	0.59	0.50	0.67	1.14
2010Q3	1.96	1.04	0.63	0.66	0.81	0.78	0.79	0.87	0.95	0.68	0.61	0.60	0.59	0.79	0.59	0.50	0.68	1.14
2010Q4	1.98	1.04	0.63	0.66	0.81	0.78	0.79	0.87	0.95	0.68	0.61	0.60	0.59	0.79	0.59	0.50	0.68	1.15

Source: Authors' estimates.

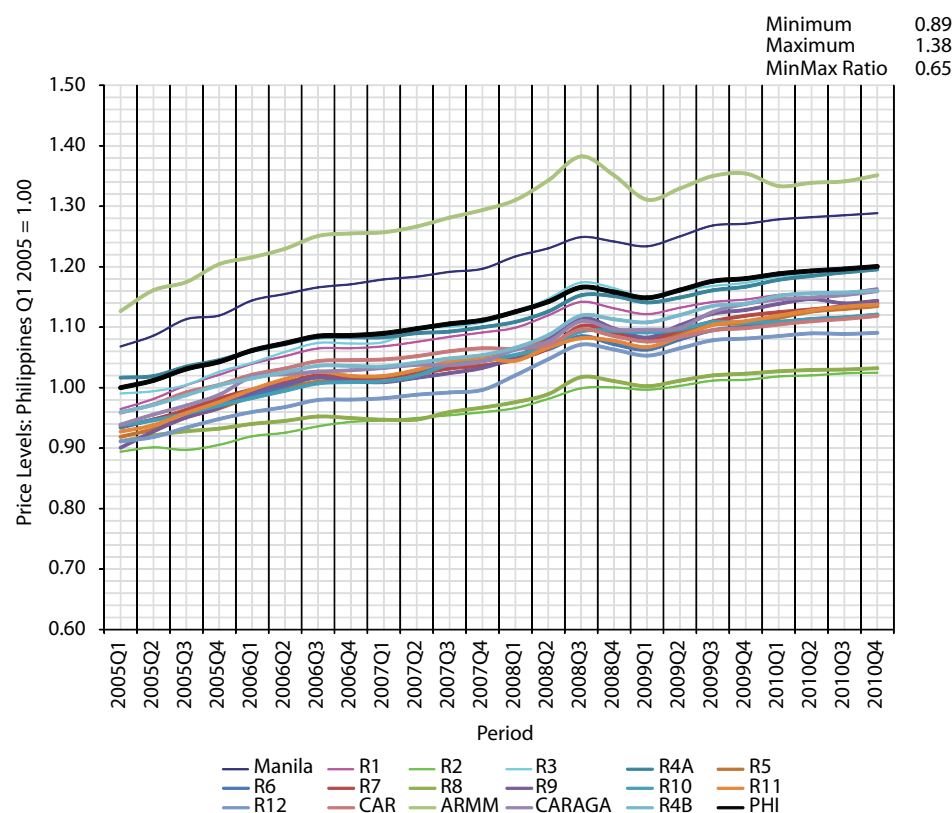
**Appendix Table 6 and Appendix Figure 6: Fuel, Light, and Water
Quarterly Regional Price Index, 2005–2010**



Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	0.93	1.04	0.90	1.17	1.15	1.12	0.93	1.05	0.96	1.06	0.92	0.75	0.83	1.04	0.98	0.89	0.84	1.00
2005Q2	0.95	1.05	0.92	1.20	1.16	1.13	0.95	1.07	0.98	1.08	0.95	0.78	0.84	1.08	1.00	0.92	0.85	1.02
2005Q3	0.96	1.09	0.94	1.24	1.17	1.23	0.98	1.09	0.99	1.11	0.97	0.80	0.86	1.12	1.01	0.94	0.86	1.04
2005Q4	0.98	1.13	1.01	1.30	1.21	1.27	1.02	1.15	1.02	1.16	1.01	0.84	0.89	1.18	1.06	0.99	0.89	1.08
2006Q1	1.02	1.17	1.06	1.33	1.25	1.34	1.04	1.19	1.05	1.19	1.06	0.87	0.91	1.25	1.08	1.04	0.92	1.12
2006Q2	1.05	1.20	1.06	1.32	1.44	1.35	1.03	1.19	1.05	1.19	1.07	0.89	0.90	1.25	1.09	1.05	0.93	1.15
2006Q3	1.05	1.21	1.11	1.33	1.46	1.38	1.06	1.21	1.08	1.21	1.09	0.93	0.91	1.28	1.11	1.06	0.95	1.17
2006Q4	1.05	1.21	1.10	1.33	1.46	1.38	1.05	1.20	1.08	1.20	1.09	0.92	0.91	1.27	1.12	1.06	0.95	1.16
2007Q1	1.06	1.21	1.09	1.34	1.46	1.39	1.05	1.20	1.08	1.21	1.10	0.93	0.92	1.28	1.14	1.06	0.95	1.17
2007Q2	1.06	1.24	1.09	1.34	1.48	1.41	1.05	1.20	1.09	1.23	1.12	0.96	0.92	1.30	1.14	1.06	0.95	1.18
2007Q3	1.08	1.25	1.10	1.35	1.49	1.41	1.06	1.22	1.09	1.24	1.13	0.94	0.92	1.31	1.15	1.07	0.96	1.19
2007Q4	1.06	1.26	1.13	1.35	1.51	1.44	1.09	1.27	1.12	1.27	1.15	0.95	0.94	1.33	1.18	1.09	0.98	1.20
2008Q1	1.08	1.31	1.18	1.37	1.54	1.44	1.14	1.35	1.15	1.31	1.19	0.97	0.97	1.35	1.23	1.12	1.00	1.22
2008Q2	1.12	1.33	1.19	1.39	1.55	1.42	1.18	1.36	1.17	1.33	1.22	1.02	0.99	1.39	1.27	1.18	1.02	1.25
2008Q3	1.12	1.37	1.24	1.45	1.57	1.42	1.25	1.43	1.22	1.38	1.27	0.97	1.03	1.44	1.33	1.26	1.09	1.28
2008Q4	1.13	1.33	1.18	1.44	1.56	1.38	1.20	1.37	1.19	1.33	1.26	0.94	0.99	1.42	1.31	1.21	1.07	1.26
2009Q1	1.12	1.28	1.12	1.40	1.53	1.35	1.15	1.30	1.16	1.31	1.23	0.92	0.97	1.34	1.32	1.17	1.04	1.24
2009Q2	1.18	1.31	1.13	1.41	1.52	1.37	1.15	1.29	1.17	1.32	1.26	0.93	0.98	1.34	1.33	1.16	1.04	1.26
2009Q3	1.18	1.33	1.17	1.46	1.53	1.43	1.19	1.34	1.19	1.38	1.31	0.97	1.00	1.39	1.36	1.20	1.06	1.28
2009Q4	1.18	1.37	1.20	1.50	1.55	1.47	1.22	1.40	1.21	1.39	1.33	1.06	1.01	1.43	1.45	1.19	1.07	1.31
2010Q1	1.22	1.41	1.22	1.52	1.58	1.50	1.24	1.44	1.22	1.42	1.35	1.15	1.03	1.45	1.38	1.22	1.10	1.34
2010Q2	1.27	1.45	1.22	1.54	1.60	1.56	1.25	1.48	1.22	1.44	1.38	1.23	1.05	1.46	1.39	1.25	1.11	1.37
2010Q3	1.27	1.45	1.26	1.53	1.60	1.55	1.26	1.49	1.21	1.43	1.38	1.32	1.04	1.46	1.39	1.26	1.12	1.37
2010Q4	1.26	1.46	1.33	1.56	1.60	1.62	1.31	1.53	1.22	1.45	1.38	1.31	1.04	1.47	1.47	1.29	1.15	1.39

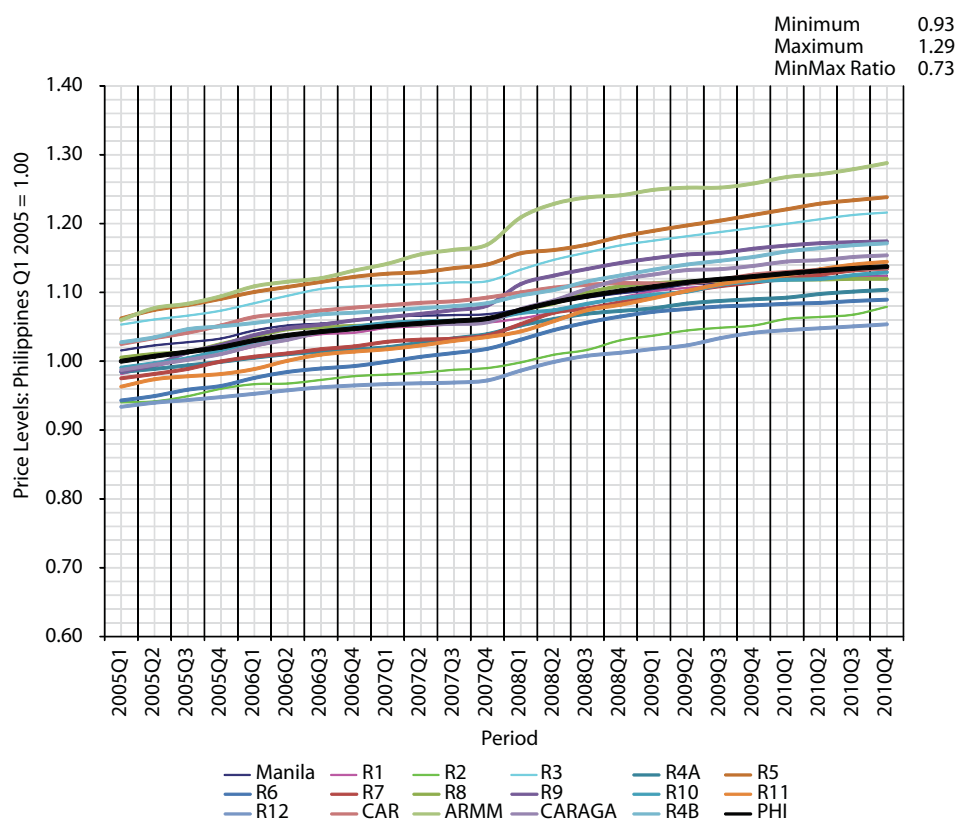
Source: Authors' estimates.

Appendix Table 7 and Appendix Figure 7: Services Quarterly Regional Price Index, 2005–2010**Philippines Q1 2005 = 1.00**

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.07	0.96	0.89	0.99	1.02	0.92	0.93	0.94	0.91	0.90	0.94	0.93	0.91	0.96	1.13	0.94	0.96	1.00
2005Q2	1.09	0.98	0.90	0.99	1.02	0.93	0.95	0.95	0.92	0.93	0.95	0.94	0.92	0.97	1.16	0.96	0.97	1.01
2005Q3	1.11	1.00	0.90	1.00	1.03	0.95	0.96	0.96	0.93	0.95	0.96	0.96	0.93	0.99	1.17	0.97	0.99	1.03
2005Q4	1.12	1.02	0.91	1.03	1.05	0.97	0.97	0.98	0.93	0.97	0.97	0.98	0.95	1.00	1.20	0.99	1.00	1.04
2006Q1	1.14	1.04	0.92	1.04	1.06	0.99	0.99	1.00	0.94	0.99	0.98	1.00	0.96	1.02	1.22	1.02	1.02	1.06
2006Q2	1.15	1.05	0.93	1.06	1.07	1.00	1.00	1.01	0.95	1.01	0.99	1.01	0.97	1.03	1.23	1.02	1.03	1.07
2006Q3	1.17	1.06	0.94	1.07	1.08	1.01	1.02	1.02	0.95	1.02	1.01	1.03	0.98	1.04	1.25	1.03	1.04	1.09
2006Q4	1.17	1.07	0.94	1.07	1.08	1.01	1.01	1.02	0.95	1.01	1.01	1.02	0.98	1.05	1.26	1.03	1.04	1.09
2007Q1	1.18	1.07	0.95	1.08	1.08	1.01	1.01	1.02	0.95	1.01	1.01	1.02	0.98	1.05	1.26	1.03	1.04	1.09
2007Q2	1.18	1.08	0.95	1.10	1.09	1.02	1.02	1.02	0.95	1.02	1.02	1.03	0.99	1.05	1.27	1.04	1.04	1.10
2007Q3	1.19	1.08	0.95	1.10	1.09	1.04	1.04	1.03	0.96	1.02	1.04	1.04	0.99	1.06	1.28	1.04	1.05	1.11
2007Q4	1.20	1.09	0.96	1.11	1.10	1.05	1.04	1.04	0.97	1.03	1.04	1.05	1.00	1.07	1.29	1.04	1.05	1.11
2008Q1	1.22	1.10	0.97	1.12	1.11	1.07	1.05	1.05	0.98	1.05	1.05	1.04	1.02	1.06	1.31	1.06	1.07	1.13
2008Q2	1.23	1.12	0.98	1.15	1.13	1.08	1.06	1.07	0.99	1.08	1.07	1.07	1.05	1.07	1.34	1.08	1.09	1.14
2008Q3	1.25	1.14	1.00	1.17	1.15	1.11	1.09	1.10	1.02	1.12	1.09	1.08	1.07	1.10	1.38	1.11	1.12	1.17
2008Q4	1.24	1.13	1.00	1.16	1.15	1.09	1.07	1.09	1.01	1.10	1.09	1.08	1.06	1.09	1.35	1.10	1.11	1.16
2009Q1	1.23	1.12	1.00	1.15	1.14	1.08	1.06	1.08	1.00	1.08	1.09	1.07	1.05	1.08	1.31	1.10	1.11	1.15
2009Q2	1.25	1.13	1.00	1.16	1.15	1.09	1.08	1.09	1.01	1.10	1.10	1.08	1.07	1.08	1.33	1.10	1.12	1.16
2009Q3	1.27	1.14	1.01	1.17	1.16	1.10	1.09	1.11	1.02	1.12	1.11	1.10	1.08	1.10	1.35	1.13	1.14	1.18
2009Q4	1.27	1.15	1.01	1.17	1.17	1.11	1.10	1.12	1.02	1.13	1.11	1.11	1.08	1.10	1.35	1.14	1.14	1.18
2010Q1	1.28	1.15	1.02	1.18	1.18	1.12	1.11	1.12	1.03	1.14	1.11	1.12	1.09	1.10	1.33	1.15	1.15	1.19
2010Q2	1.28	1.16	1.02	1.19	1.18	1.13	1.11	1.13	1.03	1.15	1.11	1.13	1.09	1.11	1.34	1.15	1.16	1.19
2010Q3	1.29	1.16	1.02	1.19	1.19	1.13	1.12	1.13	1.03	1.14	1.12	1.13	1.09	1.11	1.34	1.15	1.16	1.20
2010Q4	1.29	1.16	1.02	1.19	1.20	1.13	1.12	1.14	1.03	1.14	1.12	1.14	1.09	1.12	1.35	1.16	1.16	1.20

Source: Authors' estimates.

Appendix Table 8 and Appendix Figure 8: Miscellaneous Items
Quarterly Regional Price Index, 2005–2010



Philippines Q1 2005 = 1.00

	Manila	R1	R2	R3	R4A	R5	R6	R7	R8	R9	R10	R11	R12	CAR	ARMM	CARAGA	R4B	PHI
2005Q1	1.02	0.98	0.94	1.05	0.98	1.06	0.94	0.98	1.01	0.98	0.99	0.96	0.93	1.03	1.06	0.99	1.03	1.00
2005Q2	1.02	0.99	0.94	1.06	0.99	1.07	0.95	0.98	1.01	0.99	1.00	0.97	0.94	1.03	1.08	0.99	1.03	1.01
2005Q3	1.03	1.00	0.95	1.07	0.99	1.08	0.96	0.99	1.01	1.01	1.00	0.98	0.94	1.04	1.08	1.00	1.05	1.01
2005Q4	1.03	1.01	0.96	1.07	1.00	1.09	0.96	1.00	1.03	1.02	1.02	0.98	0.95	1.05	1.09	1.01	1.05	1.02
2006Q1	1.04	1.02	0.97	1.08	1.01	1.10	0.98	1.01	1.04	1.04	1.03	0.99	0.95	1.06	1.11	1.02	1.06	1.03
2006Q2	1.05	1.03	0.97	1.10	1.01	1.11	0.98	1.01	1.05	1.05	1.04	1.00	0.96	1.07	1.12	1.03	1.06	1.04
2006Q3	1.05	1.04	0.97	1.11	1.01	1.12	0.99	1.02	1.05	1.05	1.04	1.01	0.96	1.07	1.12	1.04	1.07	1.04
2006Q4	1.06	1.04	0.98	1.11	1.02	1.12	0.99	1.02	1.05	1.06	1.05	1.01	0.96	1.08	1.13	1.05	1.07	1.05
2007Q1	1.06	1.05	0.98	1.11	1.02	1.13	1.00	1.03	1.05	1.06	1.06	1.02	0.97	1.08	1.14	1.05	1.07	1.05
2007Q2	1.07	1.05	0.98	1.11	1.03	1.13	1.01	1.03	1.05	1.07	1.06	1.02	0.97	1.08	1.16	1.05	1.08	1.06
2007Q3	1.07	1.05	0.99	1.11	1.03	1.14	1.01	1.03	1.06	1.07	1.06	1.03	0.97	1.09	1.16	1.05	1.08	1.06
2007Q4	1.07	1.06	0.99	1.12	1.04	1.14	1.02	1.04	1.06	1.08	1.06	1.04	0.97	1.09	1.17	1.06	1.08	1.06
2008Q1	1.08	1.06	1.00	1.13	1.05	1.16	1.03	1.05	1.07	1.11	1.07	1.04	0.99	1.10	1.21	1.08	1.10	1.07
2008Q2	1.09	1.07	1.01	1.15	1.06	1.16	1.05	1.07	1.08	1.12	1.07	1.06	1.00	1.11	1.23	1.09	1.10	1.09
2008Q3	1.09	1.08	1.02	1.16	1.07	1.17	1.06	1.08	1.10	1.13	1.08	1.07	1.01	1.11	1.24	1.11	1.12	1.09
2008Q4	1.10	1.09	1.03	1.17	1.07	1.18	1.07	1.09	1.11	1.14	1.09	1.08	1.01	1.11	1.24	1.12	1.12	1.10
2009Q1	1.10	1.10	1.04	1.18	1.08	1.19	1.07	1.09	1.11	1.15	1.10	1.09	1.02	1.11	1.25	1.13	1.13	1.11
2009Q2	1.11	1.11	1.04	1.18	1.08	1.20	1.08	1.10	1.12	1.16	1.10	1.10	1.02	1.11	1.25	1.13	1.14	1.11
2009Q3	1.11	1.11	1.05	1.19	1.09	1.20	1.08	1.11	1.12	1.16	1.11	1.11	1.03	1.12	1.25	1.13	1.15	1.12
2009Q4	1.12	1.12	1.05	1.19	1.09	1.21	1.08	1.11	1.12	1.16	1.12	1.12	1.04	1.13	1.26	1.14	1.15	1.12
2010Q1	1.12	1.12	1.06	1.20	1.09	1.22	1.08	1.12	1.12	1.17	1.12	1.13	1.05	1.13	1.27	1.14	1.16	1.13
2010Q2	1.12	1.12	1.06	1.21	1.10	1.23	1.08	1.13	1.12	1.17	1.12	1.13	1.05	1.13	1.27	1.15	1.16	1.13
2010Q3	1.12	1.12	1.07	1.21	1.10	1.23	1.09	1.13	1.12	1.17	1.13	1.14	1.05	1.13	1.28	1.15	1.17	1.13
2010Q4	1.12	1.12	1.08	1.22	1.10	1.24	1.09	1.13	1.12	1.17	1.13	1.14	1.05	1.13	1.29	1.15	1.17	1.14

Source: Authors' estimates.

References

- ADB. 2007. *2005 International Comparison Program in Asia and the Pacific: Purchasing Power Parities and Real Expenditures*. Asian Development Bank, Manila. Available: www.adb.org/Documents/Reports/ICP-Purchasing-Power-Expenditures/PPP-Real-Expenditures.pdf.
- . 2008. *Research Study on Poverty Specific Purchasing Power Parities*. Asian Development Bank, Manila. Available: beta.adb.org/sites/default/files/Poverty-Specific-PPP.pdf.
- . 2009. RETA 6482: Improving Price Collection of Non-Household Expenditure Components and Updating Purchasing Power Parity Estimates for Selected Developing Member Countries. Asian Development Bank, Manila. Available: beta.adb.org/data/icp/reta-6482-background.
- International Labour Organization, International Monetary Fund, Organisation for Economic Cooperation and Development, Statistical Office of the European Communities, United Nations, The International Bank for Reconstruction and Development, and The World Bank. 2004. *Consumer Price Index Manual—Theory and Practice*. Geneva. Available: www.ilo.org/public/english/bureau/stat/guides/cpi/index.htm#manual.
- National Statistics Office. 2011. Technical Notes on the Rebasing of the Consumer Price Index from the 1994 Base Year to 2000 Base Year. Manila. Available: www.census.gov.ph/data/technotes/notecpi_rebase.html.
- NSCB. 2009. Resolution No. 5: Approving the Estimation Methodology for the 2006-based Consumer Price Index for the Bottom 30 Percent Income Group Households. National Statistical Coordination Board, Manila. Available: www.nscb.gov.ph/resolutions/2009/5.asp.
- World Bank. 2007. *ICP 2003-2006 Handbook*. Available: siteresources.worldbank.org/ICPINT/Resources/270056-1183395201801/icp_RevCh4.doc.
- . 2008. *Global Purchasing Power Parities and Real Expenditures: 2005 International Comparison Program*. Washington, DC. Available: siteresources.worldbank.org/ICPINT/Resources/icp-final.pdf?bcsi_scan_97e98328e2b67804=0&bcsi_scan_filename=icp-final.pdf.

About the Paper

Yuri Dikhanov, Chellam Palanyandy, and Eileen Capilit analyze the plausibility of integrating the International Comparison Program with the consumer price index (CPI) by computing subnational purchasing power parities using regional prices and expenditure weights from the CPI for the Philippines. The study shows that prices collected for the CPI could be used to provide reliable estimates of price levels across regions, and that regional price movements are highly correlated. The substitution effect of using year 2000 expenditure weight, however, has not been explored in this study.


About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than \$2 a day, with 903 million struggling on less than \$1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org/economics
ISSN: 1655-5252
Publication Stock No. WPS124253

December 2011

 Printed on recycled paper



Printed in the Philippines