Regional Relative Price Disparities and Their Driving Forces
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The East Asian Economic Review is also available online at [www.eaerweb.org].

PISSN : 2508-1640
EISSN : 2508-1667
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Regional Relative Price Disparities and Their Driving Forces

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This paper studies the long-run behavior of relative price dispersion among cities in Korea with a special emphasis on heterogeneous transitional patterns of price level dynamics. Formal statistical tests indicate considerable evidence for rejecting the null of relative price level convergence among the majority of cities over the sample period of 1985-2015. The analysis of gravity model suggests that the effect of transportation costs on intercity price level differentials is limited, while other socioeconomic factors, such as income, input factor prices, demographic structure, and housing price growth, play key roles in accounting for persistent regional price level disparities. Individual price levels are found to be better explained by a multiple-component model, and the deviations from PPP may be attributed to distinct stochastic common trends that are characterized by income and demographic structure.

Keywords: Relative Price Convergence, Purchasing Power Parity, Heterogeneous Transition, Factor Model, Multiple Stochastic Trends

JEL classification: C28, C38, E31, F22

I. INTRODUCTION

This paper studies relative price level convergence by utilizing panels of major cities in Korea. While substantial research continues to evaluate price level disparities in international context, there have been relatively lack of successful empirical studies investigating the validity of purchasing power parity (PPP) within a single currency area. To gain further insight for the sources of considerable and persistent

† Corresponding Author. This work was supported by the National Research Foundation of Korea Grant funded by the Korean Government (NRF-2014S1A5A8018398).
price level dispersion, we employ formal statistical techniques to test whether intranational price level differentials tend to shrink over time with a special emphasis on their heterogeneous transitional behavior. Our empirical analysis explores potential explanations for why there is substantial deviation from PPP or markedly slow convergence by considering disaggregated CPI data classified according to consumption expenditure in addition to extant factors that are attributable to the PPP deviations, such as transportation costs, income, and input prices.

The importance of understanding both time-series and cross-sectional properties of price dispersion measures has been underscored by researchers as well as policymakers. Since PPP has been a key building block of most open-economy macroeconomic models as the link between exchange rate and relative price levels, empirical validity of PPP is a long-standing issue. Ever since Rogoff (1996) articulated the PPP puzzle, a large number of papers have studied price level convergence with international data and potential sources of PPP deviation or slow price level convergence.1 This has also brought about interest in testing convergence in relative city price within a country to better understand difference in prices across locations, Beck, Hubrich, and Marcellino (2009), Cecchetti, Mark, and Sonora (2002), Parsley and Wei (1996), and Sonora (2008), to name a few. Unlike international data, it may be reasonable to conjecture that major cities of a country share relatively similar characteristics, and thus relative price dispersion is unlikely to be substantial. However, the conclusion regarding long-run patterns of price disparities across cities is somewhat mixed, whereas PPP clearly is violated in the short run in those studies. Interestingly, some studies argue that price level convergence rates within a country are somewhat longer than those estimated with international data (Cecchetti, Mark, and Sonora, 2002).

Despite the fact that the deviation from PPP is well documented in international data and even within a country, there has not been an extensive study rigorously investigating the possibility of PPP among major cities in Korea.2 This motivates

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1 For an excellent survey of PPP puzzle, see Murray and Papell (2005) and Taylor and Taylor (2004), among others.

2 Recently, in his paper, Moon (2017) studies relative price convergence among 6 metropolitan cities and 9 provinces over the period of 1990-2016 in Korea. Although the paper deals with somewhat similar issues, but the methodology employed in this study allows us to study a more general case of multiple common factors driving long-run PPP deviations.
us to examine the long-run behavior of relative price level dispersion with a special emphasis on heterogeneous transition dynamics of individual prices. In addition, with disaggregated CPI data, the paper scrutinizes dynamic patterns of price disparities for consumption expenditure categories classified according to purpose. Our research has primarily three goals. First, we investigate whether there exist persistent regional price level disparities, and, if so, assess the extent of deviations from PPP. In addition, their dynamic patterns are also examined. Second, and more importantly, this paper aims to provide a better understanding of main factors that drive substantial price level disparities across cities. Third, as overall price divergence does not necessarily exclude the possibility of club convergence, we explore whether there is a subgroup of cities that share similar aspects in terms of socioeconomic variables and exhibit price level convergence among the member cities.

To draw attention to the importance of regional price level dispersion, we first document some salient features of intercity price differentials. Some basic descriptive statistics of price differential variability and mean absolute log price differential indicate that there is little evidence of price level convergence. Relative price dispersion employed by Crucini, Telmer, and Zachariadis (2005) and Phillips and Sul (2007) also tells us somewhat similar stories and provides further evidence of heterogeneous transitional dynamics of individual prices. Given the PPP deviations or possibly slow convergence among cities in Korea obtained from our preliminary analysis, we introduce a formal statistical technique, time-varying factor model, to test whether relative price levels converge to a single common factor. The log t convergence test by Phillips and Sul (2007) strongly rejects the null hypothesis of overall price level convergence during sample periods of 1985:M1-2015:M12 for

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3 Note that another approach to disaggregation that is equally popular in the literature is to deal with consumption expenditure by major type of product. The empirical analysis with this type of disaggregated CPI data yields largely the same conclusion.

4 There has been no clear consensus about how best to measure price dispersion. Thus, in this paper, we introduce some commonly used measures of intercity price differentials in the literature (Canzoneri, Cumby, Diba, and Eudey, 2002; Imbs, Mumtaz, Ravn, and Rey, 2005; Parsley and Wei, 1996).

5 A rapidly growing number of studies have stressed the importance of heterogeneity in dynamic panel regression models due to Stock and Watson (2002) and Bai (2003) in a variety of contexts, such as Kim and Rous (2012) and Phillips and Sul (2009).
10 major cities and 1990:M1-2015:M12 for a larger set of 30 cities.\textsuperscript{6} Moreover, for none of individual consumption categories, there is little evidence of price convergence.

The apparent violation of PPP among cities in Korea motivates us to explore possible sources of regional price level disparities. As suggested by a number of studies, we employ extant factors of PPP deviations, such as distance as a proxy for unobservable transportation costs (Crucini and Yilmazkuday, 2014; Engel and Rogers, 1996; Obstfeld and Taylor, 1997; Parsley and Wei, 1996) and income (Bergin and Glick, 2007; Crucini, Telmer, and Zachariadis, 2005).\textsuperscript{7} While much work has been undertaken to extend the analysis of the effects of those conventional variables, there have also been important developments that examine the role of non-traditional determinants such as other socioeconomic factors that possibly account for regional price disparities. Therefore, in this paper, we additionally utilize city-specific socioeconomic characteristics such as the composition of labor market and demographic structure (Maestas, Mullen, and Powell, 2016). To summarize our empirical findings, the analysis of gravity model indicates that the effect of transportation costs on intercity price differentials is limited, while other socioeconomic city-specific factors, such as income, input factor prices, demographic distribution, and housing price growth, play key roles in accounting for regional price level disparities. Our clustering analysis, in general, confirms that price levels are governed by a finite number of multiple common stochastic trends. Finally, multinomial logit regression analysis suggests that the deviation from PPP may be attributed to differences in income and demographic distribution, while the role of factors that are traditionally recognized as dominant forces of persistent price dispersion, for example transportation costs, is found to be limited.

The remainder of the paper is organized as follows. The next section discusses price dispersion measures and documents some salient features of intercity price

\textsuperscript{6} As an alternative hypothesis, one can consider the case that the relative prices diverge from one another or real exchange rates between cities contain a stochastic trend. More interestingly. There is the possibility that a part of cities from the entire panel shares common stochastic trend, which can be interpreted as club convergence. This will be extensively discussed in Section 4.

\textsuperscript{7} An intuition behind this approach introducing an income-related variable is that firm’s mark-up decision is influenced by the level of income, commonly measured by per capita GDP (Rose and Engel, 2002). Other potential sources of price dispersion involve, for example, input factor prices (Crucini and Yilmazkuday, 2014; Parsley and Wei, 2001a; Rogers, 2007) and differences in opportunity cost of price search (Alessandria and Kaboski, 2011).
differential found in price level data. Section introduces a formal statistical technique to test whether price levels tend to converge over time. In addition, potential sources of PPP deviations are discussed in a number of dimensions. In Section 4, we study the possibility of multiple common stochastic trends in price levels and discuss characteristics of member cities in each price level convergence club. Concluding remarks are contained in Section 5.

II. REGIONAL PRICE DIFFERENTIAL: STYLIZED FACTS

This section documents some salient features of intercity price differential found in price level data. We begin with price level data with a special emphasis on their potential issues in empirical applications. In addition, price dispersion measures popularly employed in the literature are discussed. By utilizing price level data for major cities in Korea, this section provides preliminary findings with regard to the possibility of price level convergence.

1. Data and Some Related Issues

For the data on prices of individual goods and services, this paper employs panels of monthly observations on the Consumer Price Index (CPI) for some selected cities in Korea obtained from the Statistics Korea. Due to data availability, sample period varies with the number of cities used in a panel. In this paper, we consider mainly two sets of cities: the former covers 10 major cities that are relatively homogeneous with the sample period spanning from 1985:M1 to 2015:M12, the latter contains a larger number of cities, 30 cities, but with a relatively short sample period, 1995:M1-2015:M12. In addition to all-item CPI as a measure

8 It is important to note that this paper studies price level convergence, not actual price of each individual item in a market basket.

9 The cities and their corresponding abbreviations are as follows. For the sample of 10 major cities, Seoul (SEO), Busan (BUS), Daegu (DAE), Incheon (INC), Gwangju (GWA), Daejeon (DAJ), Suwon (SUW), Chuncheon (CHU), Cheongju (CHE), and Jeonju (JEO). In addition to these cities, the sample of 30 cities also contains Ulsan (ULS), Seongnam (SUN), Uijeongbu (UJJ), Bucheon (BUC), Wonju (WON), Gangneung (GAN), Chungju (CHJ), Cheonan (CHA), Boryeong (BOR), Gunsan (GUS), Namwon
of average cost of living for each city, detailed expenditure categories classified according to purpose are also utilized to investigate the possibility of price convergence for a particular item.\textsuperscript{10}

Since the data for price level used in this paper are price indices, not actual prices, the conclusion of whether relative price disparities across cities shrink or not evidently depends on when the base year is. That is, for instance, if the base year is set to the end of time-series observations, $T$, all price indices, by construction, have the same value, $P_{t,i} = 100$ for all $i = 1, 2, \cdots, N$, where $N$ is the number of cross sectional observations. However, this does not necessarily indicate that all price levels converge to a single point. To overcome this issue, following the suggestion by Phillips and Sul (2007), we take the first observation of a sample as the base year, $P_{t,i} = P_{i,1}/P_{i,i} \times 100$ for all $t = 1, 2, \cdots, T$, and throw out some initial observations from the sample to avoid base-year initialization effects.\textsuperscript{11} Next, as this paper is aimed to study long-run dynamics of PPP deviations, we use the Hodrick-Prescott trend of price indices to remove cyclical components of the data.

2. Price Dispersion Measures and PPP Deviations

Before employing formal statistical techniques, it is useful to look at some summary statistics on intercity price dispersion and the dynamic pattern of price differential variability. The most popular measure of the intercity price differential, which is analogous to real exchange rate in international data, in the previous studies such as Canzoneri, Cumby, Diba, and Eudey (2002), Imbs, Mumtaz, Ravn, (NAM), Mokpo (MOK), Yeosu (YEO), Suncheon (SUC), Pohang (POH), Gyeongju (GYE), Andong (AND), Gumi (GUM), Jinju (JIN), and Jeju (JEJ).

\textsuperscript{10} The major expenditure categories involve “food and non-alcoholic beverages,” “alcoholic beverages and tobacco,” “clothing and footwear,” “housing, water, electricity and other fuels,” “furnishings, household equipment and routine household maintenance,” “health,” “transport,” “communication,” “recreation and culture,” “education,” “restaurants and hotels,” and “miscellaneous goods and services.”

\textsuperscript{11} The number of observations that must be discarded may vary across price indices, all item CPI and CPI by consumption expenditure categories. For simplicity, however, we remove the same number of initial observations that are sufficient to shirk the initial effects for all price indices used in this paper.
and Rey (2005), and Parsley and Wei (1996), is the percentage difference in price of commodity $k$ at time $t$ between cities $i$ and $j$. That is to say,

$$ q_{ij,k,t} \equiv \ln(P_{i,k,t} - P_{j,k,t}) = p_{i,k,t} - p_{j,k,t}, \quad i \neq j, $$

where $p_{i,k,t} \equiv \ln P_{i,k,t}$ as an example. Under the null of PPP as the natural benchmark, $q_{ij,k,t}$ is zero, but, in practice, prices in different locations are regularly found to differ mainly due to transportation costs, which is popularly substituted for distance.\footnote{For alternative measures of price dispersion based on this intercity price differential, see Parsley and Wei (2001b), for example.}

To yield a graphical impression of relative price convergence, we first compute intercity price differential, the log CPI in each city relative to the log CPI in Seoul as the benchmark city.\footnote{Note that in an international context, the conclusion of PPP tests is found to be somewhat sensitive to the choice of benchmark or numeraire currency. However, the choice of benchmark city has little influence for the tests for cities within a country including this paper.} Price differential variability at each period $t$ is then defined as the cross-sectional standard deviation of the price difference given in Eq. (1). Panel (a) of Figure 1 plots the percentage price differential variability during the sample period, 2000:M1-2015:M12 for both 10 cities and 30 cities in Korea. As apparent in the figure, cross-sectional standard deviations do not exhibit any pattern, and thus substantial intercity price differential may persist over time. Interestingly, the variability of price differential across 30 cities tends to rise. This suggests that, in Korea, it is not surprising that regional price disparities exist to some extent, but a more puzzling empirical issue is why PPP deviations appear to be greater over time. Alternatively, we also present mean absolute price differential, which is defined as the mean percentage absolute deviation of log prices between cities, $|p_{i,k,t} - p_{j,k,t}|$, where $i$ is Seoul. The mean absolute price differentials shown in Panel (b) of Figure 1 tell somewhat similar stories. That is, there seems to be little evidence of price level convergence since PPP deviations measured by price indices tend to be greater over time, especially for a larger set of cities.
As presented in Table 1, we investigate the dynamic patterns of price differential variability and mean average price differential for each group of individual items in CPI market basket for the comparison with all-item CPI. There are mainly two approaches depending on how consumption expenditure is disaggregated, “consumption expenditure by major type of product” and “consumption expenditure according to purpose.” The former is divided into two broad categories, “commodities” and “services,” and the latter consists of 12 major components of CPI market basket classified according to the purpose of consumption expenditure. Some important implications directly emerge from the table. First, intercity price differentials for both commodities and services do not exhibit a tendency that diminishes during the

14 To conserve on space, the results for 30 cities, which are qualitatively quite similar, are not presented (available from the author upon request).
sample period. Moreover, the log service price differences across major cities tend to rise over time. In addition, services have the higher mean average price while there is essentially no difference in price differential variability between the two categories. Second, none of categories classified by consumption expenditure purpose display the pattern that intercity price differentials diminish over time. From the table we observe that, of the 12 categories, “transport” and “education” have the highest mean price differential while “transport” exhibits the highest variability of price differential. Not surprisingly, “health” and “communication” appear to have the lowest intercity price differential.\(^{15}\) These findings suggest that PPP deviation, if exists, is not simply explained by a single dominant factor, which motivates us to explore potential sources of why intercity price differentials persist over time.

### Table 1. Descriptive Statistics of Intercity Price Differential

<table>
<thead>
<tr>
<th>Panel I: Major type of product</th>
<th>Variability of price differential</th>
<th>Mean absolute price differential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>2.80  2.61  2.78  3.05</td>
<td>3.37  3.63  3.13  3.31</td>
</tr>
<tr>
<td>Panel II: Consumption purpose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food and non-alcoholic beverages</td>
<td>4.45  4.01  4.50  4.93</td>
<td>5.31  5.53  4.66  5.67</td>
</tr>
<tr>
<td>Alcoholic beverages and tobacco</td>
<td>3.16  2.98  3.36  3.16</td>
<td>2.79  2.41  2.73  3.29</td>
</tr>
<tr>
<td>Clothing and footwear</td>
<td>3.79  3.82  3.82  3.73</td>
<td>4.46  4.37  4.37  4.67</td>
</tr>
<tr>
<td>Housing, water, electricity, gas and other fuels</td>
<td>8.18  7.29  8.48  8.97</td>
<td>7.65  6.24  7.67  9.31</td>
</tr>
<tr>
<td>Furnishings, household equipment and routine maintenance</td>
<td>6.76  6.63  6.72  6.95</td>
<td>5.90  5.69  5.89  6.17</td>
</tr>
<tr>
<td>Health</td>
<td>2.27  1.77  2.31  2.84</td>
<td>2.32  1.98  2.42  2.62</td>
</tr>
<tr>
<td>Transport</td>
<td>12.97 12.88 13.01 13.03</td>
<td>10.77 10.69 10.73 10.91</td>
</tr>
<tr>
<td>Communication</td>
<td>3.01  2.99  2.99  3.06</td>
<td>2.20  2.08  2.21  2.33</td>
</tr>
<tr>
<td>Recreation and culture</td>
<td>4.69  4.57  4.77  4.76</td>
<td>3.90  3.67  4.02  4.06</td>
</tr>
<tr>
<td>Education</td>
<td>6.66  5.51  7.00  7.69</td>
<td>10.29 10.00 10.04 10.90</td>
</tr>
<tr>
<td>Restaurants and hotels</td>
<td>5.31  4.89  5.20  5.94</td>
<td>3.96  3.85  3.77  4.27</td>
</tr>
<tr>
<td>Miscellaneous goods and services</td>
<td>6.44  5.60  6.66  7.24</td>
<td>5.06  4.45  5.04  5.83</td>
</tr>
</tbody>
</table>

Note: The numbers indicate time-series mean of standard deviation of percentage price differential and absolute deviation of log prices between cities during each subsample.

\(^{15}\) Note that these findings must be interpreted with an extreme caution because our empirical analysis is based on disaggregated price data, not actual prices of individual items, although this analysis is well beyond the scope of the current paper.
Next, we consider an alternative measure of price dispersion, relative price dispersion, which becomes increasingly popular in the literature. Specifically, following Cecchetti, Mark, and Sonora (2002), Crucini, Telmer, and Zachariadis (2005), and Phillips and Sul (2007), among other, we first compute the deviation of log price from its mean,

$$h_{i,k,t} = \frac{p_{i,k,t}}{N^{-1} \sum_{i=1}^{N} p_{i,k,t}}.$$  \hspace{1cm} (2)

That is, $h_{k,t}$ measures the extent how each price index in period $t$ deviates from its cross sectional mean in that period.\(^{16}\) As a benchmark, $h_{i,k,t}$ will asymptotically approach to one under the null of PPP. To investigate how $h_{i,k,t}$ evolves over time, we define a quadratic distance measure of cross sectional variance for log of each price index $k$, $p_{i,k,t}$, as

$$H_{k,t} = \frac{1}{N} \sum_{i=1}^{N} (h_{i,k,t} - 1)^2, \ \forall k.$$ \hspace{1cm} (3)

Since $h_{i,k,t}$ will be converging to one for all $i$ in the long run under the null of overall convergence, $H_{k,t} \to 0$ as $t \to \infty$.\(^{17}\) Thus, by examining how $H_{k,t}$ evolves over time, we can examine whether PPP holds or not.

Figure 2 plots the cross-sectional variance for each price index, $H_{k,t}$ for 10 major cities in Korea.\(^{18}\) Since $H_{t}$ does not display any tendency to decline over time, price level disparities across cities do not shrink. Moreover, none of $H_{k,t}$, except for “clothing and footwear,” exhibits a decreasing pattern during the sample period.\(^{19}\)

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\(^{16}\) One of advantages using this price dispersion measure is that the dynamic pattern of $h_{i,k,t}$ can be interpreted as transition coefficient measuring how log price in city $i$ behaves relative to the cross sectional mean.

\(^{17}\) However, when the overall convergence does not hold, $H_{k,t}$ will be some positive number as $t \to \infty$. Note that this does not necessarily suggest that some cities in a sample do not share a common trend. This issue will be rigorously discussed in Section 4.

\(^{18}\) Due to base-year initialization effects, approximately the first half of observations are removed from the sample. Note also that the patterns of the cross-sectional variances in the sample of 30 cities are found to be qualitatively similar.

\(^{19}\) Notice that the cross-sectional variance for “Housing, water, electricity, gas and other fuels” displays a marked upward trend, and hence this implies that intercity differences in overall prices might be due to this category.
This is entirely consistent with findings from the intercity price differential presented in Figure 1 and Table 1. Therefore, our visual inspection suggests that PPP among major cities in Korea does not hold, but there seems to be no clear answer to the question of what drives the PPP deviation because any of disaggregated CPI data that has an increasing cross-sectional variance can be a potential source.

**Figure 2. Cross-sectional Variances and Base-year Initialization Effects**

Note: Each solid line (left scale) represents cross-sectional variance $H_{k,t}$ for the $k$th category of CPI classified according to expenditure purpose for $k = 1, \ldots, 12$ across 10 cities, and the dotted line (right scale) is $H_t$ for all-item CPI.

**Figure 3. Relative Transitional Coefficients of Price Level for 10 Major Cities**

Note: Each line indicates the deviation of log price level for city $i$ from its cross-sectional mean, $h_{i,t}$, as defined in Eq. 2.
One of empirical advantages using relative price dispersion measure over a simple intercity price differential is to allow us to explore dynamic behavior of each individual price from its cross-sectional mean. Figure 3 illustrates relative transition curves for 10 major cities in Korea, and some important implications immediately emerge. First, as apparent in the figure, relative price dispersion measures do not converge to the unity over the sample period, which implies a violation of PPP. Second, there appear to be some heterogeneous transitional dynamics of price level data. Each transitional coefficient has a distinct dynamic path. For instance, Chuncheon and Busan have somewhat similar initializations, but their transition dynamics are considerably different. The transition path for Chuncheon involves shift from a high initial relative price to a low relative price, while the evolution of price level in Busan has the opposite manner. Next, Seoul and Chunchoen involve substantially different initial states, but their transitional curves tend to converge towards the same state over the sample period. Interestingly, some cities such as Suwon and Cheongju do not reveal a marked transitional dynamics.

III. CONVERGENCE TESTS AND EXPLANATIONS FOR PPP DEVIATION

In this section we first employ a formal statistical technique to test whether price level disparities tend to shrink over time. In addition, by utilizing disaggregated CPI data, we examine if there exists a potentially important factor that drives the observed intercity price differentials. Next, with city-specific characteristics in various dimensions, we investigate possible explanations for PPP deviations.

1. Tests of Relative Convergence

To test whether prices relative to their cross-sectional mean tend to decrease during sample period, we begin with the assumption that prices are generated from

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20 Each individual price categories has the same pattern (available from the authors upon request).
Regional Relative Price Disparities and Their Driving Forces

Alternatively, for instance, log price level in city $i$ is assumed to be given by

$$p_{it} = \delta_{it} \theta_t,$$ (4)

where $\theta_t$ is a single common component that individual price levels share and $\delta_{it}$ is time-varying factor loading coefficient, which measures relative transitional effects from $\theta_t$. Under the null of relative convergence, cross-sectional price disparities decrease over time or, equivalently, $H_{k,t} \to 0$ as $t \to \infty$.

Following Phillips and Sul (2007), the empirical specification of price convergence test takes the form,

$$\log H_{k,t}^{1} - 2 \log(\log t) = a + \gamma \log t + \varepsilon_t, \text{ for } t = rT, rT+1, \cdots, T,$$ (5)

where $r \in [0.2, 0.3]$. Under this representation, the null and alternative hypothesis are

$$H_0: \gamma \geq 0 \quad \text{and} \quad H_A: \gamma < 0.$$ (6)

Thus, by estimating the slope coefficient of this log $t$ regression model, one can test the null hypothesis that all prices have a tendency toward a common factor with one-sided $t$ test of $\gamma \geq 0$. It is worth noting that the log-$t$ convergence test has no advantage over conventional time-series unit-root tests, if there is indeed a single common factor. Nonetheless we utilize this convergence concept, which does not depend on any particular assumptions on (non)stationarity in the common component, to deal with possible multiple common factors in the price data.

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21 This assumption does not necessarily imply that intercity price level differentials contain a single stochastic trend.

22 Note that, in this paper, the time-varying factor loading coefficient $\delta_{it}$ is modeled by $\delta_{it} = \delta_i + L(t)^{-1} t^{-\alpha_i}$, where $L(t)$ is a slow moving function, such as log $t$. For a detailed discussion about the concept of relative convergence and the log-$t$ convergence test, see Phillips and Sul (2007).

23 The alternative hypothesis involves that, at least, one price diverges from the common stochastic trend. Therefore, relative convergence test based on the log $t$ convergence does not rule out the possibility of club convergence. This issue will be discussed in some detail in the following section.
### Table 2. Relative Convergence Test Results

<table>
<thead>
<tr>
<th>r-value in log ( t ) regression</th>
<th>( r = 0.200 )</th>
<th>( r = 0.225 )</th>
<th>( r = 0.250 )</th>
<th>( r = 0.275 )</th>
<th>( r = 0.300 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>All items</td>
<td>-0.63</td>
<td>-0.64</td>
<td>-0.65</td>
<td>-0.66</td>
<td>-0.67</td>
</tr>
<tr>
<td></td>
<td>(-70.7)</td>
<td>(-126.8)</td>
<td>(-321.0)</td>
<td>(-506.5)</td>
<td>(-583.3)</td>
</tr>
<tr>
<td>Goods</td>
<td>-0.61</td>
<td>-0.63</td>
<td>-0.65</td>
<td>-0.67</td>
<td>-0.68</td>
</tr>
<tr>
<td></td>
<td>(-71.2)</td>
<td>(-65.4)</td>
<td>(-80.5)</td>
<td>(-119.2)</td>
<td>(-219.4)</td>
</tr>
<tr>
<td>Services</td>
<td>-0.68</td>
<td>-0.67</td>
<td>-0.66</td>
<td>-0.66</td>
<td>-0.65</td>
</tr>
<tr>
<td></td>
<td>(-199.8)</td>
<td>(-163.8)</td>
<td>(-188.7)</td>
<td>(-259.6)</td>
<td>(-363.2)</td>
</tr>
<tr>
<td><strong>Panel II: 30 cities (1990:M1–2015:M12)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All items</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.38</td>
</tr>
<tr>
<td></td>
<td>(-15.8)</td>
<td>(-13.5)</td>
<td>(-11.9)</td>
<td>(-11.0)</td>
<td>(-10.5)</td>
</tr>
<tr>
<td>Goods</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.38</td>
<td>-0.39</td>
</tr>
<tr>
<td></td>
<td>(-51.2)</td>
<td>(-37.4)</td>
<td>(-43.9)</td>
<td>(-71.9)</td>
<td>(-163.5)</td>
</tr>
<tr>
<td>Services</td>
<td>-0.49</td>
<td>-0.49</td>
<td>-0.49</td>
<td>-0.49</td>
<td>-0.50</td>
</tr>
<tr>
<td></td>
<td>(-81.7)</td>
<td>(-74.9)</td>
<td>(-71.6)</td>
<td>(-70.2)</td>
<td>(-66.4)</td>
</tr>
</tbody>
</table>

Note: The numbers are slope coefficient estimate \( \hat{\gamma} \) and the corresponding \( t \) statistics calculated with the heteroskedasticity and autocorrelation consistent (HAC) estimator for the covariance of \( \gamma \) are in parenthesis.

Table 2 presents the log \( t \) convergence test results for panels of log price levels for 10 cities and 30 cities with a variety of \( r \) values. First, the conclusion regarding relative convergence does not depend on the choice of \( r \) value. Next, the first row of each panel in the table indicates that overall convergence in regional price level is strictly rejected as \( \hat{\gamma} \) is statistically significantly less than zero. This finding implies that PPP clearly does not hold in Korea.  

Third, as Alessandria and Kaboski (2011), Engel (1999), and Chari, Kehoe, and McGrattan (2002), to name a few, argue that deviations from the law of one price in tradable goods play a key role in explaining PPP violation across countries, we investigate price convergence within each major product type, “goods” and “services” that represent tradable and non-tradable category, respectively. Both panels show that there is little evidence of price convergence among cities for both categories.

\[24\] Since some components of CPI market basket is evidently subject to regulation preventing prices from adjusting, we remove those categories, “alcoholic beverages and tobacco” and “communication” from the sample, but the main conclusion is found to be the same.
Table 3. Relative Convergence Test Results: Disaggregated CPI by Consumption Purpose

<table>
<thead>
<tr>
<th>Consumption Purpose</th>
<th>r-value in log t regression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r = 0.200</td>
</tr>
<tr>
<td>Food and non-alcoholic beverages</td>
<td>-0.62</td>
</tr>
<tr>
<td></td>
<td>(-213.9)</td>
</tr>
<tr>
<td>Alcoholic beverages and tobacco</td>
<td>-0.49</td>
</tr>
<tr>
<td></td>
<td>(-20.4)</td>
</tr>
<tr>
<td>Clothing and footwear</td>
<td>-0.32</td>
</tr>
<tr>
<td></td>
<td>(-18.1)</td>
</tr>
<tr>
<td>Housing, water, electricity and other fuels</td>
<td>-0.57</td>
</tr>
<tr>
<td></td>
<td>(-26.6)</td>
</tr>
<tr>
<td>Furnishings, household equipment and routine household maintenance</td>
<td>-0.33</td>
</tr>
<tr>
<td></td>
<td>(-28.2)</td>
</tr>
<tr>
<td>Health</td>
<td>-0.34</td>
</tr>
<tr>
<td></td>
<td>(-46.4)</td>
</tr>
<tr>
<td>Transport</td>
<td>-0.38</td>
</tr>
<tr>
<td></td>
<td>(-609.1)</td>
</tr>
<tr>
<td>Communication</td>
<td>-0.60</td>
</tr>
<tr>
<td></td>
<td>(-2721.3)</td>
</tr>
<tr>
<td>Recreation and culture</td>
<td>-0.43</td>
</tr>
<tr>
<td></td>
<td>(-18.2)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.76</td>
</tr>
<tr>
<td></td>
<td>(-662.4)</td>
</tr>
<tr>
<td>Restaurants and hotels</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>(-51.7)</td>
</tr>
<tr>
<td>Miscellaneous goods and services</td>
<td>-0.20</td>
</tr>
<tr>
<td></td>
<td>(-3.7)</td>
</tr>
</tbody>
</table>

Note: The numbers are slope coefficient estimate $\hat{\gamma}$ and the corresponding $t$ statistics calculated with the heteroskedasticity and autocorrelation consistent (HAC) estimator for the covariance of $\gamma$ are in parenthesis.

Despite obvious PPP deviations in Korea, it is not quite clear which components of CPI market basket potentially explain the failure of price level convergence with those broad product categories. A natural response to overcome this issue is to utilized more disaggregated CPI components. The log $t$ convergence test results for 12 price indices according to consumption expenditure purpose are presented...
in Table 3. Surprisingly, none of prices relative cross-sectional mean does not display a tendency to decrease over time, which is in line with visual inspection shown in the previous section. That is, the estimates of log $t$ regression model, $\hat{y}$ are consistently less than zero for any of the disaggregated price data. Further empirical analysis with a more detailed price items in CPI market basket, which is not reported in this present paper, also suggests that there is no particular CPI component that dominates the dynamic pattern of persistent regional disparities in overall price level.\footnote{The test statistics are obtained from the sample of 10 major cities. Notice that the test results for 30 cities have the same conclusion.}

2. Factors Driving Intercity Price Differentials

For both panels of 10 major cities and 30 cities in Korea, the log $t$ convergence test consistently suggests that price levels do not converge to their cross-sectional mean. In addition, since disaggregated CPI data indicates that any of individual prices for items included the CPI market basket does not exhibit a convergence pattern, the sources of the apparent PPP deviations may not be quite clear. Therefore, this motivates us to investigate possible explanations for regional price level disparities by employing a variety of city-specific socioeconomic factors rather than individual consumption expenditure categories.

To uncover explanations for why there exist substantial and persistent PPP deviations, a number of empirical studies have suggested potential sources of relative price level dispersion in an international context. First, distance, as a proxy for unobservable transportation costs, probably the most popular factor used in the literature.\footnote{Investigating sources of intercity price differentials for each price category should prove useful. However, this analysis is well beyond the scope of the current paper, and thus we leave this for future research.} Many empirical findings, such as Crucini and Yilmazkuday (2014), Engel and Rogers (1996), Obstfeld and Taylor (1997), and Parsley and Wei (1996),

\footnote{Despite the fact that whether PPP hold on a pre-tax or tax adjusted basis might be an important empirical issue, we did not consider tax adjustment price data in this paper. This is because it is hard to imagine trade barriers such as tariffs play a key role in explaining PPP deviation within a country. Moreover, it is plausible that consumers care more about post-tax prices when purchasing goods and services, but there is little different in tax rate across cities in Korea.}
suggest that the distance between two cities appears to be positively associated with the intercity price differentials with the effect being the strongest among traded goods. Thus the introduction of transaction costs into a model may help understand real exchange rate dynamics.\(^{28}\) Next, as one of the most compelling explanations for overall price level divergence, some studies attribute much of persistent PPP deviations to the presence of nontraded-goods prices. Empirical tests routinely have found that the deviations from PPP tend to be greater and last longer for services (Beck, Hubrich, and Marcellino, 2009; Glushenkova and Zachariadis, 2016).

In addition to these possible explanations for the PPP deviations, empirical studies have employed a variety of variables to capture city-specific effects on the deviations from PPP. These include main demand and supply shifters that influence prices, such as income (Bergin and Glick, 2007; Crucini, Telmer, and Zachariadis, 2005) and wage (Crucini and Yılmazkuday, 2014; Parsley and Wei, 2001a; Rogers, 2007). An intuition behind this approach introducing an income-related variable is that firm’s mark-up decision influenced by the level of income, commonly measured by per capita GDP, although the direction of how those are associated may differ across types of products.\(^{29}\) However, it is worth noting that the use of income to account for regional price level disparities is somewhat problematic due to a possible endogeneity of income and the price level. Thus, in this paper, some well-known proxies for income will be experimented. Next, prices set by suppliers are primarily determined by the prices of input factors, for example wages, rents, and return to capital. In particular, wage as a measure of labor costs is frequently used for proxy for non-tradable components of CPI market basket.\(^{30}\) Moreover, empirical studies, e.g., Beck and Weber (2003), have suggested that price dispersion appears to be larger as labor markets are less integrated.\(^{31}\) Finally, Alessandria (2009) and Alessandria and Kaboski (2011), among others, point out that differences in opportunity cost of

\(^{28}\) To examine whether the distance effect differs across different product groups, a squared distance in addition to distance is commonly employed (Parsley and Wei, 2001b).

\(^{29}\) Some studies, e.g., Rose and Engel (2002), relate price convergence to market integration patterns in which the role of comovement of income variations is emphasized.

\(^{30}\) Note that differences in wage differences can in part be attributable to the failure of income convergence (Engel and Rogers, 2004).

\(^{31}\) However, the role of wage difference in accounting for PPP deviation becomes weaker labor mobility increases (Crucini and Yılmazkuday, 2014).
price search, which in turn depends on local wage, may help understand price disparities due to search frictions. In sum, those city-specific variables widely used in the literature allow us to account for possible heterogeneity that potentially leads to persistent intercity price level differentials.

To yield potential explanations for why relative prices do not converge over time or possibly why convergence is so slow, we introduce a number of variables including those discussed above to uncover the sources of persistent PPP deviations. Our approach is to investigate factors influencing intercity price differentials by considering a simple linear gravity model. In general, the gravity model utilizes gravitational force concept as an analogy to account for the volume of trade, international capital flow, and price dispersion. For instance, in an international context, gravity models establish a baseline for price dispersion as determined by GDP, population, and distance. Following Cecchetti, Mark, and Sonora (2002), Engel and Rogers (1996), and Parsley and Wei (1996), we begin by introducing the most popular factors representing arbitrage costs used in this type of empirical analysis. These costs involve distance between city locations that are positively associated with transportation costs and the presence of non-tradable goods and inputs, and would increase variations of relative prices. First, to explain the effects of market segmentation, we estimate a simple price gravity model by regressing intercity price differentials on distance measures. As we present in columns I and II of Table 4, we examine whether intercity price level differentials defined as Eq. (1) can be explained by transportation costs measured by the logarithm of distance between cities together with a squared distance to explore a possible non-linearity in this relationship for both panels of cities. For a set of major 10 cities that are relatively more homogeneous and have integrated market than other smaller cities, transportation costs do not play a role in explaining price dispersion across cities.

32 The use of a linear gravity model is to compare our empirical results with those suggested in the previous studies. It is worth noting that there may be some theoretical reasons of nonlinear dynamic behavior of relative prices, although this analysis is well beyond the scope of the current paper.

33 For a theoretical justification of price gravity regression models, see Engel and Rogers (1998). Note that, for the variability of real exchange rate, most studies include a border dummy to evaluate the so-called “border effect.”

34 The data for all explanatory variables used in this paper are obtained from Statistics Korea. For a detailed description of the variables and their summary statistics are available from the authors.
However, when we add other cities to the sample, distance between cities has some ability to account for PPP deviations, but the distance effect does not display convexity feature.\textsuperscript{35} This finding does not come to surprise as Korea is relatively a small country and markets are highly integrated.

Next, we add several commonly used variables such as income, input prices, and market integration, to the price gravity model to examine economic influences on the distance effects.\textsuperscript{36} As we discussed earlier in this paper, income is measured by education level, a fraction of individuals with a college degree, due to possible endogeneity problem. Since wage data is not available, land price growth rate is employed as an effective proxy for input costs. To measure the extent of market integration and city size, the logarithm of population is used. The estimation results are presented in Column III of the table. Most importantly, after controlling for those factors, the price gravity model suggests that there is little evidence of distance effects even for the panel of 29 cities.\textsuperscript{37} For the case of 10 major cities, the estimated coefficients for those explanatory variables are not significantly different from zero, except for education. On the other hand, all three factors are found to be important sources of intercity price level differentials with the correct signs of the estimates suggested by theories. The higher income measured by education level and land price growth rate are, the higher cities have general price levels. Since product market becomes more integrated as the size of city increases measured by population (Engel and Rogers, 2004), a city with relatively less integrated market appears to have a higher price level.

Since our preliminary analysis of relative price disparities among cities in Korea suggests there exist substantial heterogeneities across the cities, we introduce a number of potentially important variables representing city-specific characteristics

\textsuperscript{35} As some studies, for example Parsley and Wei (1996), document that the non-linear distance effects differ across product groups, it may be useful to examine the role of transaction costs for each consumption expenditure categories. We leave this issue for a future research direction.

\textsuperscript{36} Note that all explanatory variables employed in our empirical analysis are differences in the variables between cities.

\textsuperscript{37} For the data availability, Jeju is removed from the sample of 30 cities for this analysis.
in addition to commonly used factors for PPP deviations in the literature. Controlling for those factors, the price gravity model estimation results presented in columns IV of Table 4 yield somewhat common stories for both panels. As in model specification III, transportation costs have little impact on the price level disparities. By adding other socioeconomic factors into the model specification, the conventional explanations for PPP deviations become increasingly important since the estimates for education, land price growth, and log population are consistently significant even at the 1% level for both 10-city and 29-city panels. The additional variables employed in this paper indicate that the socioeconomic characteristics of cities play a key role in accounting for the deviations from PPP. Notably, the composition of labor market influencing firms’ markup decision and input factor prices is found to be a dominant driving force of regional price disparities. The higher is net labor inflow growth reflecting faster labor force growth, the lower producers increase their prices reflecting relatively lower price level. Moreover, a city with demographic structure of higher population ages 65 and above growth tends to have a relatively higher price level. This result may be consistent with the fact that older population appears to have the largest real wealth level among age groups in Korea. There also exists ample microeconomic evidence, e.g., Kaplan, Menzio, Rudanko, and Trachter (2016), that relative price dispersion stems from in part sellers’ attempts to discriminate between types of buyers due to price search costs (Alessandria and Kaboski, 2011), which in turn may depend on the buyers’ demographic factors, such as age and gender. According to spatial equilibrium models, a shift in labor supply in a city is largely a function of its amenities, and thus we employ EQ-5D index measuring the quality of life in a city. Since the coefficient of EQ-5D index is significantly different from zero, relative price dispersion may come from the differences in life quality across cities. Finally, as we mentioned earlier, the sizable portion of PPP deviation can be explained by different housing price growth rates.

38 Those variables that are not reported in our empirical results because they have little power to account for intercity price differential include, for example, population density, industry structure, electricity usage, Jeonse price, birth rate, tax revenue, and modern market ratio.

39 Despite the potential endogeneity issue, we also include estimation results with income data, per capita GRDP, in model specification V to compare our empirical findings with the previous studies with income data.
Table 4. Explanations for Intercity Price Differentials

<table>
<thead>
<tr>
<th></th>
<th>10 cities</th>
<th></th>
<th>29 cities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
</tr>
<tr>
<td>Log distance</td>
<td>-0.16</td>
<td>-5.93</td>
<td>-3.32</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td>(6.92)</td>
<td>(7.13)</td>
<td>(3.18)</td>
</tr>
<tr>
<td>Log distance squared</td>
<td>0.61</td>
<td>0.32</td>
<td>-0.06</td>
<td>-0.21</td>
</tr>
<tr>
<td></td>
<td>(0.72)</td>
<td>(0.75)</td>
<td>(0.34)</td>
<td>(0.44)</td>
</tr>
<tr>
<td>Education</td>
<td>0.05</td>
<td>0.09***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per capita GRDP</td>
<td></td>
<td></td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.11)</td>
<td></td>
</tr>
<tr>
<td>Land price growth</td>
<td></td>
<td></td>
<td>0.09</td>
<td>2.79***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.45)</td>
<td>(0.35)</td>
</tr>
<tr>
<td>Log population</td>
<td>-0.41</td>
<td>-8.02***</td>
<td>-6.92***</td>
<td>-0.81***</td>
</tr>
<tr>
<td></td>
<td>(0.55)</td>
<td>(0.91)</td>
<td>(1.24)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Net labor inflow growth</td>
<td></td>
<td></td>
<td>-17.6***</td>
<td>-15.4***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.53)</td>
<td>(2.06)</td>
</tr>
<tr>
<td>EQ-5D index</td>
<td>1.39***</td>
<td>2.56***</td>
<td></td>
<td>0.37***</td>
</tr>
<tr>
<td></td>
<td>(0.45)</td>
<td>(0.51)</td>
<td></td>
<td>(0.16)</td>
</tr>
<tr>
<td>Population ages 65 and above growth</td>
<td>0.83***</td>
<td>0.63***</td>
<td>0.06***</td>
<td>0.06***</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.14)</td>
<td>(0.01)</td>
<td>(0.01)</td>
</tr>
<tr>
<td>Housing price growth</td>
<td>1.88***</td>
<td>1.33***</td>
<td></td>
<td>-1.09***</td>
</tr>
<tr>
<td></td>
<td>(0.33)</td>
<td>(0.43)</td>
<td></td>
<td>(0.20)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.56</td>
<td>13.8</td>
<td>8.69</td>
<td>1.97</td>
</tr>
<tr>
<td></td>
<td>(3.01)</td>
<td>(16.1)</td>
<td>(16.3)</td>
<td>(7.24)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.00</td>
<td>0.02</td>
<td>0.10</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Note: ***, **, and * denote statistical significance at the 1%, 5% and 10% levels respectively.

IV. MULTIPLE STOCHASTIC TRENDS OF PRICE LEVEL AND THEIR DETERMINANTS

This section scrutinizes the possibility that individual prices are governed by multiple stochastic common trends by utilizing a clustering algorithm. Next, we estimate the number of common components, and investigate explanations for why there exist some distinct trends that cause apparent PPP deviations. In addition, we discuss characteristics of member cities in each price level convergence club.
1. Clustering Common Trends of Prices

Our empirical analysis successfully suggests that PPP does not hold among cities in Korea as price disparities between cities, in general, do not tend to decrease over time. However, this conclusion suggested under the assumption that all prices are governed by a single stochastic common trend does not necessarily imply that all of price levels are diverging from the common component. Even in a benchmark case that only price level of city $i$ diverges from the trend, while all other price levels share the common component, the log $t$ convergence test will reject the null of overall convergence in price level. Therefore, in this section, we first consider a more general factor representation allowing for a finite number of common trends. That is, instead of the simple component model given by Eq. (4), individual price levels in a panel can be modelled by

$$p_{it} = \begin{cases} 
\delta_{1, it} \theta_{it} & \text{for } \lim_{t \to \infty} \delta_{1, it} = \delta_1, \quad i \in C_1 \\
\vdots \\
\delta_{M, it} \theta_{it} & \text{for } \lim_{t \to \infty} \delta_{M, it} = \delta_M, \quad i \in C_M 
\end{cases}$$

(7)

Here $C_j$ is the $j$-th price level convergence subgroup for $j = 1, 2, \cdots, M$, where $M$ is the number of common trends, and $\lim_{t \to \infty} \delta_{j, it} = 0, \text{ if } i \notin C_j$.

To investigate the possibility of price level convergence among a part of cities in the entire panel that are relatively more homogeneous, at the outset, it is useful to divide the data into some arbitrary groups.\textsuperscript{40} Although it is not reported in this paper to conserve on space, we consider a variety of subsamples in terms of city size, geographic neighborhood, and population density, but there is little evidence of price level convergence for any of these presumed classifications. As a consequence, we employ a clustering algorithm developed by Phillips and Sul (2007), which utilizes the log $t$ convergence test subsequently. That is, the stepwise application

\textsuperscript{40} In the analysis of real exchange rate, some studies, e.g., Parsley and Wei (1995), consider subsample of countries, such as OECD countries, to examine the extent of deviations from PPP.
of the log $t$ convergence tests has the ability to separate out individual prices from a common trend.\footnote{Specifically, after a subgroup of cities having the highest price level is chosen to form a core group, the number of cities in the core group is determined. Next, a series of log $t$ convergence tests allow us to decide which cities are to be included in club 1, and the rest of cities will form the second group. If relative convergence holds for group 2, there are two convergence clubs. If not, repeat the steps above to check if the second group can be divided into other convergence clubs. For a detailed instruction on clustering algorithm and club-merging tests, see Phillips and Sul (2007) and Phillips and Sul (2009).}

The empirical results of clustering analysis for price level measured by all-item CPI are presented in Table 5. There exist three convergence clubs for both 10-city and 30-city panels. Albeit their different sample periods, it is worth noting that club convergence classification for 10 major cities is nested by that of 30 cities, as the 10 cities classified from the clustering analysis with 30 cities in bold face are the same in those found in Panel I of Table 5. For each convergence club, the slope coefficient $\hat{γ}$ is statistically greater than or equal to zero implying that PPP deviations among member cities tend to shrink over time as price levels within a club converge toward their own common trend. Each convergence club displays very distinctive pattern of price level change. The first convergence club can be classified as high price level, while cities in club 3 appear to have a relatively low price level.

<table>
<thead>
<tr>
<th>Panel I: 10 cities (1985:M1-2015:M12)</th>
<th>( \hat{γ} )</th>
<th>( t\hat{γ} )</th>
<th>Member cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Club 1 [2]</td>
<td>-0.03</td>
<td>-0.30</td>
<td>Busan, Suwon</td>
</tr>
<tr>
<td>Club 2 [6]</td>
<td>0.35</td>
<td>5.03</td>
<td>Seoul, Daegu, Gwangju, Daejeon, Chuncheon, Jeonju</td>
</tr>
<tr>
<td>Club 3 [2]</td>
<td>1.36</td>
<td>3.51</td>
<td>Incheon, Cheongju</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel II: 30 cities (1990:M1-2015:M12)</th>
<th>( \hat{γ} )</th>
<th>( t\hat{γ} )</th>
<th>Member cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Club 1 [4]</td>
<td>0.30</td>
<td>17.65</td>
<td>Busan, Suwon, Seongnam, Uijeongbu</td>
</tr>
<tr>
<td>Club 2 [16]</td>
<td>0.05</td>
<td>1.98</td>
<td>Seoul, Daegu, Gwangju, Daejeon, Gunsan, Ulsan, Bucheon, Chuncheon, Wonju, Cheonan, Boryeong, Jeonju, Namwon, Mokpo, Yeosu, Suncheon</td>
</tr>
<tr>
<td>Club 3 [10]</td>
<td>0.00</td>
<td>0.15</td>
<td>Incheon, Gangneung, Cheongju, Chungju, Pohang, Gyeongju, Andong, Gumi, Jinju, Jeju</td>
</tr>
</tbody>
</table>

Note: Entries in square brackets indicate the number of member cities. $\hat{γ}$ and $t\hat{γ}$ represent the slope coefficients of Eq. (5) and corresponding $t$-statistics, respectively.

There should be some reasonable explanations for why the groups of cities have persistently different price levels. However, at this point, it is not quite clear which...
factors may drive those distinctive stochastic common trends. Before formally investigating possible explanations for the different common trends, we apply the clustering analysis to each of consumption expenditure categories. Convergence club classifications for 10 major cities presented in Table 6 suggest some important implications. First and most importantly, none of the clustering results is compatible with price level club convergence classification. This implies that there is no single dominant factor that drives persistent PPP deviations. Second, as the patterns of price dispersion across countries considerably differ across individual expenditure categories especially in terms of club member cities, further microeconomic studies are inevitable to better understand long-run dynamic behavior of prices.

Table 6. Convergence Club Classification: 12 Consumption Expenditure Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>γ</th>
<th>tγ</th>
<th>Member cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and non-alcoholic beverages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [3]</td>
<td>3.05</td>
<td>121.16</td>
<td>Busan, Gwangju, Jeonju</td>
</tr>
<tr>
<td>Club 2 [7]</td>
<td>-0.03</td>
<td>-1.12</td>
<td>Seoul, Daegu, Incheon, Daegon, Suwon, Chuncheon, Cheonju</td>
</tr>
<tr>
<td>Alcoholic beverages and tobacco</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [5]</td>
<td>0.01</td>
<td>0.30</td>
<td>Busan, Daegu, Gwangju, Daegon, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [2]</td>
<td>1.81</td>
<td>1.44</td>
<td>Incheon, Suwon</td>
</tr>
<tr>
<td>Club 3 [2]</td>
<td>0.57</td>
<td>2.90</td>
<td>Seoul, Cheonju, Jeonju</td>
</tr>
<tr>
<td>Clothing and footwear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [2]</td>
<td>-0.12</td>
<td>-1.20</td>
<td>Daejeon, Cheonju</td>
</tr>
<tr>
<td>Club 2 [4]</td>
<td>0.24</td>
<td>4.73</td>
<td>Daegu, Suwon, Chuncheon, Jeonju</td>
</tr>
<tr>
<td>Club 3 [2]</td>
<td>0.24</td>
<td>16.88</td>
<td>Incheon, Gwangju</td>
</tr>
<tr>
<td>Club 4 [2]</td>
<td>0.34</td>
<td>25.43</td>
<td>Seoul, Busan</td>
</tr>
<tr>
<td>Housing, water, electricity and other fuels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [2]</td>
<td>0.00</td>
<td>-0.03</td>
<td>Seoul, Suwon</td>
</tr>
<tr>
<td>Club 2 [5]</td>
<td>0.27</td>
<td>4.40</td>
<td>Busan, Daegu, Incheon, Daegon, Jeonju</td>
</tr>
<tr>
<td>Club 3 [2]</td>
<td>-2.22</td>
<td>-0.77</td>
<td>Gwangju, Cheonju</td>
</tr>
<tr>
<td>Group 4 [1]</td>
<td>–</td>
<td>–</td>
<td>Chuncheon</td>
</tr>
<tr>
<td>Furnishings, household equipment and routine household maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [5]</td>
<td>0.11</td>
<td>29.60</td>
<td>Busan, Daejon, Suwon, Chuncheon, Cheonju</td>
</tr>
<tr>
<td>Club 2 [3]</td>
<td>0.88</td>
<td>3.22</td>
<td>Seoul, Daegu, Jeonju</td>
</tr>
<tr>
<td>Group 3 [2]</td>
<td>-1.52</td>
<td>-37.57‡</td>
<td>Incheon, Gwangju</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [3]</td>
<td>3.46</td>
<td>23.34</td>
<td>Incheon, Daejeon, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [5]</td>
<td>0.09</td>
<td>7.42</td>
<td>Seoul, Busan, Gwangju, Suwon, Jeonju</td>
</tr>
<tr>
<td>Group 3 [2]</td>
<td>-6.10</td>
<td>-6.28‡</td>
<td>Daegu, Cheonju</td>
</tr>
</tbody>
</table>
Table 6. Continued

<table>
<thead>
<tr>
<th>Category</th>
<th>( \hat{\gamma} )</th>
<th>( t\hat{\gamma} )</th>
<th>Member cities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transport</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [2]</td>
<td>2.75</td>
<td>1.92</td>
<td>Busan, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [4]</td>
<td>0.06</td>
<td>3.37</td>
<td>Seoul, Suwon, Cheongju, Jeonju</td>
</tr>
<tr>
<td>Club 3 [4]</td>
<td>0.17</td>
<td>0.85</td>
<td>Daegu, Incheon, Gwangju, Daejeon</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [2]</td>
<td>-0.08</td>
<td>-0.70</td>
<td>Seoul, Jeonju</td>
</tr>
<tr>
<td>Club 2 [2]</td>
<td>3.37</td>
<td>16.11</td>
<td>Incheon, Chuncheon</td>
</tr>
<tr>
<td>Group 3 [6]</td>
<td>-0.56</td>
<td>-694.06‡</td>
<td>Busan, Daegu, Gwangju, Daejeon, Suwon, Cheongju</td>
</tr>
<tr>
<td><strong>Recreation and culture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [4]</td>
<td>0.32</td>
<td>63.96</td>
<td>Gwangju, Daejeon, Suwon, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [4]</td>
<td>0.01</td>
<td>0.12</td>
<td>Seoul, Busan, Cheongju, Jeonju</td>
</tr>
<tr>
<td>Club 3 [2]</td>
<td>-2.12</td>
<td>-1.31</td>
<td>Daegu, Incheon</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [2]</td>
<td>0.00</td>
<td>0.00</td>
<td>Suwon, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [3]</td>
<td>0.67</td>
<td>3.81</td>
<td>Busan, Daegu, Gwangju</td>
</tr>
<tr>
<td>Club 3 [5]</td>
<td>0.11</td>
<td>13.95</td>
<td>Seoul, Incheon, Daejeon, Cheongju, Jeonju</td>
</tr>
<tr>
<td><strong>Restaurants and hotels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [7]</td>
<td>0.03</td>
<td>8.90</td>
<td>Busan, Daegu, Incheon, Daejeon, Suwon, Chuncheon, Cheongju</td>
</tr>
<tr>
<td>Club 2 [2]</td>
<td>0.15</td>
<td>1.50</td>
<td>Seoul, Jeonju</td>
</tr>
<tr>
<td>Group 3 [1]</td>
<td>-</td>
<td>-</td>
<td>Gwangju</td>
</tr>
<tr>
<td><strong>Miscellaneous goods and services</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Club 1 [3]</td>
<td>0.47</td>
<td>4.20</td>
<td>Busan, Incheon, Chuncheon</td>
</tr>
<tr>
<td>Club 2 [7]</td>
<td>-0.08</td>
<td>-0.82</td>
<td>Seoul, Daegu, Gwangju, Daejeon, Suwon, Cheongju, Jeonju</td>
</tr>
</tbody>
</table>

Note: ‡ denote statistical significance at 1% level. Entries in square brackets represent the number of cities in each subgroup.

2. Determinants of Stochastic Common Trends

Identifying driving forces that characterize three convergence clubs of price level is clearly of interest. Thus, we investigate other important factors that drive the observed clustering patterns of individual price levels. By considering potential drivers of intercity price level differentials suggested in our empirical studies in the previous section, we examine the interaction between those variables and price level. To estimate the likelihood that a city is found to be a member of each convergence club, a multinomial logit regression model is utilized. Specifically, when club \( m \) is the base club, the probability \( P_j \) for \( j = 1, 2, \ldots, m-1 \) that a city is a member of convergence club \( C_j \) is given by
\[ P_j = P(C_j | X) = \frac{\exp(x'\gamma_j)}{1 + \sum_{j=1}^{m-1} \exp(x'\gamma_j)} \],

(8)

where \( C_j \) is convergence club, \( X \) is a vector of characteristics, and \( \gamma_j \) is the vector of coefficients related to club \( j \). Since the probability of being the base club is

\[ P_m = \frac{1}{1 + \sum_{j=1}^{m-1} \exp(x'\gamma_j)} \],

(9)

the log odds ratio of being in club \( j \) relative to the base club is \( \ln(P_j/P_m) = x'\gamma_j \).

Table 7. Multinomial Logit Estimates of Price Level Club

<table>
<thead>
<tr>
<th></th>
<th>Base=Club 1</th>
<th>Base=Club 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Club 2</td>
<td>Club 3</td>
</tr>
<tr>
<td>Population ages 65 and above growth</td>
<td>-0.15</td>
<td>-0.31**</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>Log population</td>
<td>0.73</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>(1.19)</td>
<td>(1.38)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.10</td>
<td>-0.18*</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>Net labor inflow growth</td>
<td>-0.42</td>
<td>-0.62</td>
</tr>
<tr>
<td></td>
<td>(0.33)</td>
<td>(0.35)</td>
</tr>
<tr>
<td>Housing price growth</td>
<td>3.79</td>
<td>5.79**</td>
</tr>
<tr>
<td></td>
<td>(2.41)</td>
<td>(2.69)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.41</td>
<td>3.40</td>
</tr>
<tr>
<td></td>
<td>(11.0)</td>
<td>(13.6)</td>
</tr>
</tbody>
</table>

Log-likelihood = -19.56
LR \( \chi^2 \) = 19.31
Pseudo \( R^2 \) = 0.33

Note: Entries in parentheses are t-values. ** and * denote statistical significance at the 5% and 10% levels, respectively.

The data set used to estimate this model is 29 cities after removing Jeju from the sample due to data availability. Explanatory variables that we consider include population ages 65 and above growth, the logarithm of population, education level as a proxy for income, net labor inflow growth for input factor costs, and housing price growth. These variables are chosen because they appear to play a significant
role in explaining intercity price dispersion in the gravity model in Section 3. Other variables were found to be very limited support for the observed clustering patterns. Multinomial logit regression coefficients and their $t$-values are reported in Table 7.\textsuperscript{42} For instance, the estimated coefficient shown in column 2 reflects the effect of an explanatory variable on the likelihood of being in club 2 relative to the reference group, club 1. In general, the model fits the data reasonably well, as a few explanatory variables account for roughly 33% of the variation in the model. Some variables reported in Table 7 are statistically significant factors that drive different common trends of price level. The signs of the coefficients on the variables are consistent with previous research. In particular, education and population ages 65 and above growth have significant positive effects on the movement to higher long-run price level. Therefore, our empirical finding implies that the deviation from PPP may be attributed to differences in income and demographic distribution. Likewise, cities appear to be converging to their own steady states, which in turn are determined by those variable.

\section*{V. CONCLUDING REMARKS}

To explore possible sources of regional price level disparities in Korea, we utilize a variety of data sets with regard to consumption expenditure categories and cities. Despite the fact that the deviation from PPP is well documented even within a country, there have not been any studies rigorously investigating the possibility of PPP among major cities in Korea. This motivates us to study the long-run behavior of relative price level dispersion with a special emphasis on heterogeneous transition dynamics. In addition, with disaggregated CPI data, the paper scrutinizes dynamic patterns of price disparities across cities for consumption expenditure categories classified according to purpose. Given the fact that PPP deviations or possibly slow convergence, we investigate main factors that drive the price level disparities across cities.

To summarize our empirical findings, the log $t$ convergence test strongly rejects the null hypothesis of overall price level convergence during sample periods of

\textsuperscript{42} Note that the multinomial logit regression model with per capita income (GRDP), instead of education level, yields a very similar result.
1985:M1-2015:M12 for 10 major cities and 1990:M1-2015:M12 for a larger set of 30 cities. Moreover, for none of individual consumption categories, there is little evidence of price convergence. The analysis of gravity model indicates that the effect of transportation costs on intercity price differentials is limited, while other socioeconomic city-specific factors, such as income, input factor prices, demographic distribution, and housing price growth, play key roles in accounting for regional price level disparities. Our clustering analysis, in general, confirms that price levels are governed by a finite number of multiple common stochastic trends that are characterized notably by income and the growth rate of older population.

Obviously, there are some fruitful further issues that are worth pursuing. Some degree of complications in empirical analysis may improve the fit of gravity model to explain why price level differs substantially across cities otherwise similar in many respects. A promising direction would be to utilize more detailed consumption expenditure categories and to incorporate nonlinearity in relative price dynamics. In addition, as we briefly discussed in this paper, the apparent heterogeneous transitional patterns across cities suggest that it should prove useful to investigate factors driving some evolution in convergence clubs over time.

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First version received on 28 April 2017
Peer-reviewed version received on 19 June 2017
Final version accepted on 31 July 2017
The Use of “Particular Market Situation” Provision and its Implications for Regulation of Antidumping

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The particular market situation provision of the WTO Antidumping Agreement is increasingly invoked against what may be described as “input-dumping,” but this potentially violates the current Antidumping Agreement rules. This paper examines the practice and recent changes regarding the PMS provision in the US by critically examining relevant antidumping investigations in the US in light of GATT/WTO jurisprudence. Such US practice has not yet been extensively subjected to scholarly examination. The paper finds that the recent legal change in the US widens the scope and applicability of the PMS provision to cover input subsidies, allowing the use of not only surrogate prices but also surrogate costs. Further, the required standard of evidence to find PMS seems to have been diminished in the recent application. A widespread use of the PMS provision in such a deviant way calls for a fundamental review of the current trade remedy rules of the WTO.

Keywords: Particular Market Situation, PMS, Anti-dumping, Input-dumping, Input-subsidy, General Subsidy

JEL Classification: F13, F15, K33, F55, L40

I. INTRODUCTION:
THE ISSUE OF PARTICULAR MARKET SITUATION

Despite well-known flaws in the current regulation of antidumping, efforts at reform seems dismal, given the non-progress in the resumed DDA talks. In the meantime, while old squabbles about dumping margin calculating methods have not been resolved, new issues emerge. Recent issue of interest relates to “particular market situation (PMS, hereafter),” which has received little attention to date. Normally, dumping is determined by comparing home prices of the exporting country to its export prices. However, the WTO Antidumping Agreement (ADA, hereafter) allows for using two alternatives, either “comparable price of the like
product when exported to an appropriate third country” (third country sales price) or “the cost of production in the country of origin plus a reasonable amount for administrative, selling and general costs and for profits” (constructed normal value) when there is a “particular market situation” which does not permit a proper comparison with export prices. Therefore, the “particular market situation” provision opens up the opportunity to use third country sales price or constructed normal value based on costs, which has often led to finding dumping where there is none or to inflate the dumping margin.

Zhou and Percival (2016) argue that a major user of antidumping such as Australia has been prolific in using the PMS criterion against Chinese imports, mainly interpreting PMS as government control of prices. As Yun (2016) notes, aggressive state intervention to boost export competitiveness through state controlled enterprises, especially in developing countries, has caused much anxiety in the international trade community lately. The chapter on state owned enterprises in the recently negotiated Trans Pacific Partnership (TPP) Agreement to curb what is known as “non-commercial assistance,” embodies such concerns. There have always been misgivings about extensive government subsidies in the input market that may lead to artificially low cost of production, masking dumping where it actually exists. Lindsey and Ikeson (2002) show that the US has increasingly identified the problem of dumping as “artificial comparative advantage created by market distorting government policies,” breaking away from the traditional notions based on competition policy such as price discrimination or predation to justify antidumping. For example, in the DDA negotiations, US has opposed using competition policy standards to conceptualize dumping, arguing that dumping is generally the result of government policies in their domestic markets such as industrial policy, trade barriers to create “sanctuary home markets,” lax competition policy, and government price controls or subsidies giving artificial competitive advantages to their domestic firms.

In line with this perception, the recent US legal changes to its antidumping law address the perceived problem of input subsidies. A related issue of “input dumping” was raised as far back as the Uruguay Round negotiations. Input dumping is said to occur when materials used for the manufacture of a product were purchased at dumped or below cost prices. However, discussions during the UR did not result in any agreement, and the current ADA does not contain any provisions that would curtail input dumping (Furculita, 2017; Zhou and Percival, 2016).
Experts note that the PMS provision may serve as a convenient tool to replace the NME methodology applied to China, in the wake of its “possible” graduation from NME status. The NME methodology allows the use of surrogate costs to construct production costs in an antidumping investigation, which often leads to inflation of the dumping margin. Even more worrisome is the possibility that the PMS provision will be more widely invoked against any market economy when government intervention is thought to be extensive and general so that conventional countervailable subsidy provision may not provide adequate remedy. Some scholars have criticized such use of the PMS criterion as reckless, and call for a clarification of how PMS should be interpreted and to establish a disciplined standard of review for finding dumping when there is a particular market situation (Watson, 2014; Zhou and Percival, 2016; Vermulst et al., 2016).

Taking heed of this calling, the current paper examines how PMS has been interpreted and applied in antidumping investigations in the US, one of the major users of antidumping measures. In particular, since the US has recently amended its antidumping law to introduce hitherto non-existing definition of PMS, potentially expanding the possibility of its application, it would be meaningful to trace how the practice of applying PMS in antidumping investigations in the US has evolved. This is done mainly by critically examining some of the major antidumping cases in the US where PMS had been an issue. This exercise elicits the standards by which the US authorities have applied the PMS criterion, and how it has evolved. But first, in the next section, the paper goes through the provisions relating to PMS

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1 Whether China automatically graduates from NME status with the expiration of Paragraph 15 of its Accession Protocol in 2016 is not entirely clear. According to Paragraph 15, importing countries are allowed to presume China to be a nonmarket economy unless proven otherwise, until December 11, 2016. China has argued that expiration of this provision at the end of 2016 guarantees it market economy status. However, others have argued that other legal interpretation is possible (see Stewart et al., 2014) and Miranda (2014)). The US has not conferred market economy status to China yet, but is in the process of reviewing China’s NME status as part of its antidumping investigation (see, “Certain Aluminum Foil from the People’s Republic of China: Notice of Initiation of Inquiry Into the Status of the People’s Republic of China as a Nonmarket Economy Country Under the Antidumping and Countervailing Duty Laws (A-570-053),” 82 FR 16162 (April 3, 2017).) China has taken the matter to the WTO, where a panel has been formed in July 2017 to adjudicate the issue. (US-Measures Related to Price Comparison Methodologies (DS515: 2016), EU-Measures Related to Price Comparison Method (DS516: 2017)).
in the WTO Antidumping Agreement and discusses some relevant dispute cases to establish what the status quo maybe in interpreting PMS at the WTO.

II. PMS IN THE WTO ANTIDUMPING AGREEMENT

The ADA distinguishes three circumstances where export price to a third country or constructed normal value based on costs should be used: 1) there are no sales in the ordinary course of trade, 2) particular market situation such that it is not possible to make a proper comparison, 3) insufficient volume of domestic sales such that it is not possible to make a proper comparison (ADA Article 2.2). The triggering condition for the third criterion is specifically stated in footnote 2 to the ADA. It stipulates that domestic sales volume of 5 percent or more of the sales to the importing member constitutes a sufficient volume of sales allowing proper comparison. Lower levels are acceptable if evidence demonstrate that such lower ratio is of sufficient magnitude to enable a proper comparison.

To know when the first criterion applies, one would need to know what “ordinary course of trade” means. This is not explicitly defined in the ADA, but Article 2.2.1 indicates that “Sales of the like product in the domestic market of the exporting country or sales to a third country at prices below per unit (fixed and variable) costs of production plus administrative, selling and general costs” may be treated as not being in the ordinary course of trade.

This is not an exclusive definition however, and it is possible that circumstances other than below cost sales could constitute sales out of ordinary course of trade. In US-Hot Rolled Steel,2 the Appellate Body confirmed that the ADA does not define the term “ordinary course of trade” and that in this dispute, Japan had agreed to the definition given by the US authority.3 The AB was also content with this definition, and further commented that the “sales below cost” method provided by Article 2.2.1 “does not purport to exhaust the range of methods for determining whether sales are ‘in the ordinary course of trade’ and it does not cover the more

3 Ibid, para 139.
specific issue of sales between affiliated parties, because in such transactions “the affiliation itself may signal that sales above cost, [original emphasis] but below the usual market price, might not be in the ordinary course of trade.”

When and how the PMS criterion can be applied is even more elusive than in the case of the “ordinary course of trade,” although as to when the PMS criterion can be triggered is quite evident from Article 2.2. First, such a particular situation must exist, and second, because of that situation, domestic market prices become inappropriate to compare with export prices. To know when the first triggering condition is met, the scope of PMS needs to be defined. Since the term “particular market situation” is not defined anywhere in the ADA, however, it is not clear when a particular market situation can be said to exist. One natural inference would be that since transactions that are out of “ordinary course of trade” (eg, sales made at prices below cost) would have been already disregarded under the first criterion in Article 2.2, PMS probably does not refer to what would be regarded as “out of ordinary course of trade.” Depending on the scope of what is to be regarded as ordinary course of trade, PMS could refer to any number of situations that are in ordinary course of trade. PMS also probably does not refer to insufficient volume of sales, since this is so clearly defined in the footnote. Therefore, it can be inferred that PMS refers to a residual category, a situation constituting of sales that are not, for example, below cost (or any other circumstances that may said to be outside the ordinary course of trade), and meets the volume threshold, but is still unusual or particular to the home market, making it so different from the conditions of the export market such that comparing the prices of the two markets would be inappropriate. Zhou and Percival (2016) subscribe to this view.

Another approach to interpreting the term PMS is that it has an ancillary role, referring to the situation of “no sales of the like product in the ordinary course of trade.” That is, PMS is simply a reiteration, so that Article 2.2 is actually laying out only two possible cases for applying constructed normal value: in the particular condition where there is “no sales of the like product in the ordinary course of trade,” or insufficiency of volume of trade. In this case, there would be no need to separately define the term PMS. In some treatise on WTO’s antidumping rules, hardly any significance has been attached to the term PMS. For example, Matsushita et al. (2006: 409) set forth only two situations for using third-country

4 Ibid, para 147.
sales prices: 1) “when there are no sales of the like product in the ordinary course of trade,” and 2) “where there is a low volume of such sales.” They go on to explain that when there are no sales of the like product or even when there is such a sale, there may be situations where “the national antidumping authority cannot rely on the sale as the references of comparison” giving such examples as customized sales and thin domestic demand. Still, PMS is not offered as a separate category triggering the use of either export price to a third country or constructed normal value. US authorities seem to have taken a similar line of reasoning when encompassing PMS within the clause defining “ordinary course of trade” rather than giving it a stand-alone definition in the recent amendment to its antidumping law. Under the new definition of ordinary course of trade, it is made explicit that PMS shall be considered as being out of ordinary course of trade. Therefore, PMS refers to situations, the scope of which is not limited, that lie outside the ordinary course of trade, along with two other situations which are already explicitly identified (below cost sales and non-market transactions with affiliated parties: see Section 4 for more details).

Under the first approach PMS is categorized as “ordinary course of trade” while in the second approach PMS is categorized as “outside the ordinary course of trade,” but the effect is the same. Whichever approach is taken, PMS covers a broad range of situations. Under such a broad interpretation of PMS, circumstances such as government intervention or control of prices, including those that may distort the input market, would not be excluded from the ambit of PMS. Then, the natural question that follows is whether it would be reasonable to use such “distorted” input prices to construct production costs. How the cost of production should be constructed is dictated in Articles 2.2.1.1 and 2.2.2. Article 2.2.1.1 stipulates that costs shall normally be calculated on the basis of records kept by the exporter or producers under investigations, if those costs 1) follow the customary accounting principles of the exporting country, and 2) reasonably reflect the costs associated with the production and sales of the product. Further, Article 2.2.2 specifies that in principle, “the amounts for administrative, selling and general costs and for profits shall be based on actual data pertaining to the production and sales in the ordinary course of trade of the like product by the exporter of producer under investigation.” When such information is not available, the amounts can be determined on the basis of actual amounts for products belonging to the same general category of the product in question, or the weighted average of the actual amounts incurred, or any
other reasonable method, provided that the amount for profit do not exceed the profit normally realized in the same general category of products, but all from the market of the country of origin.

The second condition necessary to trigger the PMS criterion seems to be the more important, decisive one. It requires that the nature of particular market situation should be such that it does not permit proper comparison with the export price. It does not matter whether or not the particular market situation is in or out of ordinary course of trade, or whether there are sufficient volume of home sales. Whatever is said to be a particular market situation, as long as that particular market situation leads to impairment of price comparability, authorities should be able to use third country sales price or costs as normal value. Since neither the scope of PMS, nor conditions of proper price comparison is clearly defined in the Agreement, this gives wide discretion to antidumping authorities in determining the range of situations that may constitute particular market situation, as long as they can demonstrate that it impairs comparability with export price. Zhou and Percival (2016) argue that one important consideration regarding proper price comparison is to make sure whether PMS has a differential effect on domestic prices and export prices. If it only affects the domestic price, adjustments should be made in the alternative values used as normal value to reflect the effects of PMS. However, if the effect has been even handed (eg, if the effect of input subsidy for the product under question in the domestic market has also passed through to exports, which is most likely), no adjustments need to be made for a proper comparison between domestic and export prices.

Some of these questions relating to how to interpret and apply the PMS criterion have been weighed in the EC-Cotton Yarn (Brazil, 1995) GATT dispute case. In this dispute Brazil challenged EC’s determination of normal value which failed to consider the PMS prevailing in Brazil at the time. Brazil argued that during the period of review there was an exchange rate freeze and high inflation in the domestic market, which should have been factored in the construction of normal value. EC argued on the contrary, that those circumstances did not constitute PMS because they had no impact on domestic prices. The Panel agreed with the EC, and

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concluded that PMS must have impact if it is to affect comparability. The existence of PMS *per se* is not relevant.\(^6\) From this first dispute case regarding PMS under the GATT/WTO jurisprudence, we can establish some important standard of review regarding PMS:

1. The Panel did not set clear limit on the kind of situations that can give rise to PMS. External factors such as government macroeconomic policies or exchange rate policies were not specifically rejected as the grounds on which PMS can be invoked.

2. However, whatever the kind of PMS maybe, in order to constitute PMS, the circumstances must have impact on the price of the product under question.

3. Furthermore, in order to trigger the use of third country sales price or constructed normal value, such impact of PMS on prices must cause incomparability of domestic prices and export prices.

Whether surrogate costs can be used when a particular situation give rise to distorted input market has been considered in the recent *EU- Biodiesel* dispute\(^7\). EU argued that Argentina’s export tax on soybeans and soybean oil, the main raw materials used in the production of biodiesel, created a PMS in the input market, artificially lowering the prices of major inputs in the production of biodiesel. Therefore, the argument went, the records of the Argentinean producers did not reasonably reflect the raw materials costs, justifying its replacement by an average reference prices of the raw materials published by the Argentine Ministry of Agriculture. This resulted in an increase of the provisional dumping margins. Argentina contested EU’s use of surrogate costs on such a basis, arguing that EU’s Basic Regulation Article 2(5)\(^8\) was inconsistent with ADA Articles 2.2 and 2.2.1.1

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\(^6\) *Ibid*, para 478.


\(^8\) The second paragraph of the EU’s Basic Regulation Article 2(5) which was the main bone of contention, reads “If costs associated with the production and sale of the product under investigation
which require construction of normal value to be based on exporter’s records and costs existing in the originating country.

The Panel found that although EU’s regulation under question was not inconsistent with the ADA “as such,” in that the Basic Regulation Article 2(5) did not force, but merely allowed the authorities to use information outside of the originating country. However, the Panel viewed that the regulation could be applied inconsistently with ADA, which was indeed found to be the case in the biodiesel dispute. The AB upheld the Panel’s view and concluded that unreasonable domestic input prices were not a sufficient basis on which to use surrogate input prices: “…we agree with the Panel that the EU authority’s determination that domestic prices of soybeans in Argentina were lower than international prices due to the Argentine export tax system was not, in itself, a sufficient basis for concluding that the producers’ records did not reasonably reflect the costs of soybeans associated with the production and sale of biodiesel, or for disregarding the relevant costs in those records when constructing the normal value of biodiesel.”

The AB further argued that Article 2.2.1.1 of ADA required the records of the exporter to reflect costs reasonably not that the costs themselves to be reasonable. That it “… relates to whether the records kept by the exporter or producer under investigation suitably and sufficiently correspond to or reproduce those costs incurred by the investigated exporter or producer that have a genuine relationship with the production and sale of the specific product under consideration,” but did not involve an examination of the “reasonableness” of the reported costs themselves, as proposed by the EU. It agreed with the Panel’s consideration that “…the object of the comparison is to establish whether the records reasonably reflect the costs actually incurred, and not whether they reasonably reflect some hypothetical costs.

are not reasonably reflected in the records of the party concerned, they shall be adjusted or established on the basis of the costs of other producers or exporters in the same country or where such information is not available or cannot be used, on any other reasonable basis including information from representative markets.” Furculita (2017) suspects that EC specifically intended to use Article 2(5) to address the issue of input prices from markets considered to be distorted, especially considering the fact that it was introduced right after granting Russia market economy status. Article 2(5) thus enabled EU to effectively replace the NME methodology with finding PMS in input markets.

10 Appellate Body Report, EU-Biodiesel, para 7.2.
11 Ibid.
that might have been incurred under a different set of conditions or circumstances and which the investigating authority considers more “reasonable” than the costs actually incurred.”

The AB observed that Article 2.2 does not specify precisely what evidence an authority may resort to in case the records do not reasonably reflect costs, so that the authority had the right to use information other than that contained in the exporter’s records, whether it is from inside or outside the originating country, but in doing so, the authority must make adjustments to ensure that the costs reflect the cost of production in the originating country. The investigating authority may not “simply substitute the costs from outside the country of origin for the ‘cost of production in the country of origin.’ …” It should be ensured that whatever information is used, it should be used to arrive at the “cost of production in the country of origin,” even if it requires the investigating authority to adapt the information that it collects.

Further, the AB upheld the Panel’s finding that such adaptation means restoring the prevailing cost condition. It criticized the EU for not adapting the information it used to ensure that it represented the cost of production in Argentina. On the contrary, the EU authorities “specifically selected the surrogate price for soybeans to remove the perceived distortion in the cost of soybeans in Argentina,” using the particular information “precisely because it did not represent the cost of soybeans in Argentina.” Thus, the AB agreed with the Panel that the surrogate price for soybeans used by the EU authorities did not represent the cost of soybeans in Argentina and concluded that the Panel did not err in finding EU to be inconsistent with ADA, “as applied.”

AB’s ruling in the biodiesel case establishes four important principles: 1) that an investigating authority is not limited in the information it uses to construct normal value, whether the information is from inside or outside the originating country, 2) but whatever information it uses to calculate normal value, it must reflect actual cost of production in the originating country, 3) if such information is short of capturing the costs in the originating country, the authority must make adjustments to reflect real cost of production in the originating country, including those factors

12 Ibid, para 6.8.
13 Ibid, para 6.73.
14 Ibid, para 6.81.
that are perceived to be “distorting” the cost of production in the originating country, and 4) “unreasonable domestic input prices” is not a sufficient basis on which to use surrogate prices for inputs.

Initial scholarly assessments of the biodiesel rulings have been positive. For example, Furculita (2017) praises the AB ruling for skillfully distinguishing information from cost, with the effect of not infringing too much on the rights of the authorities to use the kind of information they want, but at the same time, restraining liberal use of surrogate costs for normal value construction. Unfortunately, such technical maneuvering does not put an end to the debate between those who still regard distorted input markets to represent “unfair trade” and those who feel that dealing with input market subsidies with antidumping measures is an abuse of the WTO law. There is no clear answer to the question of what members are allowed or not allowed to do when costs themselves are thought to be unreasonable. The ADA provisions do not explicitly address this question. Therefore, this is a matter of clarifying the concept of dumping and aims of the Antidumping Agreement, and not simply interpreting technical aspects of calculating methodologies under the current ADA rules. Given this backdrop of WTO deliberations on PMS, the next section examines whether the US application of the PMS provision has been consistent with these principles, and if not, what the difference might imply with respect to the future evolution of international trade regimes.

III. PMS IN US ANTIDUMPING LAW

Until recently, the term “particular market situation” was not explicitly defined anywhere in the US law, but the term appears in two places in reference to determining the normal value. According to the Tariff Act of 1930, third country sales, not cost of production, are to be used as basis of normal value under three situations: when the product under consideration is not sold in the exporting country, or amount sold is insufficient for a proper comparison, or there is particular market situation in the exporting country which does not permit proper comparison with the export price or constructed export price (Tariff Act Sec 773(a)(1)(C)). In the case where third country sales prices are used as the basis for comparison, three conditions should be fulfilled: such price has to be representative, the product should be sold in sufficient quantities, and particular market situation in the third country
does not prevent a proper comparison with the export price or constructed export price. (Tariff Act Sec 773(a)(1)(B)(ii))

Notwithstanding this rule, however, if the administering authority determines for some reason that the exporting country price cannot be used as normal value, constructed normal value based on production costs can be used instead of third country sales prices (Sec 773(a)(4): Use of Constructed Value). There are no explicit criteria which trigger the use of constructed value instead of third country sales prices, leaving the decision entirely to the discretion of the administering authority. That is, no particular hierarchy between using third country sales prices versus cost of production has been established by law. Nevertheless, the Regulation of the Department of Commerce declares that in practice, viable third country sales would be preferred to using constructed value: “The Secretary normally will calculate normal value based on sales to a third country rather than on constructed value if adequate information is available and verifiable” (Title 19 of the CFR 351.404(f)). At the same time, the pathway to using constructed value instead of third country sales prices is made more explicit under the exception in the Departmental Regulation than it is in the Tariff Act. The Regulation provides for an exception which states “The Secretary may decline to calculate normal value in a particular market … if it is established to the satisfaction of the Secretary that: (i) in the case of the exporting country or a third country, a particular market situation exists that does not permit a proper comparison with the export price or constructed export price” (19 CFR 301.404(2)).

While the Tariff Act does not define “particular market situation,” the Statement of Administrative Action associated with the URRA (1994) provides some illustrative examples. They include situations 1) where a single sale in a foreign market constitutes five percent of sales to the US, 2) extensive government controls over pricing in a foreign market, and 3) differing patterns of demand in the US and a foreign market. On the other hand, the recent amendment to the Tariff Act explicitly defines PMS as a situation that is “out of ordinary course of trade.” The Trade Preference Extension Act (TPEA) of June 2015 (Trade Remedies Act) makes significant changes to US antidumping laws governing the treatment of particular market situations. First, Section 504 of the TPEA amends Section 771(15) of the Tariff Act to expand the definition of “ordinary course of trade” by incorporating “particular market situations,” as an example of circumstances that are outside the ordinary course of trade. The amended Tariff Act Sec 771(15)(C) reads as
“Situations in which the administering authority determines that the particular market situation prevents a proper comparison with the export price or constructed export price.” This is in addition to the two existing examples, below cost sales and transactions between affiliated parties that deviate from arm’s length market prices.

The TPEA 2015 also amends the definition of constructed value (Sec 773(e)), by inserting the condition associated with particular market situation: “… if a particular market situation exists such that the cost of materials and fabrication or other processing of any kind does not accurately reflect the cost of production in the ordinary course of trade, the administering authority may use another calculation methodology under this subtitle or any other calculation methodology …” This renewed definition expands the discretion given to the authorities in choosing constructed value calculating methodology, enabling it to determine particular market situation to exist not only in the product market under consideration, but also in the related input markets of the product.

Apparently, the US antidumping law gives wide discretion to the administering authority in determining what constitutes PMS, which is not unexpected given the ambiguities in the ADA. However, given the AB report on EU-Biodiesel, the amendment to the definition of constructed value which also reserves wide discretion to the administering authority in choosing the method of calculating constructed value, including the use of costs that are not actual costs of the producer or that are not from the originating country, is potentially inconsistent with the ADA, if and when “applied.”

Despite the claim that third country sales prices are preferred to constructed normal value, statistics show that constructed value methodology takes up the greater portion in determining normal value in US antidumping investigations. An examination of preliminary determinations from 1979 to 1990 shows that a total of 119 determinations of dumping of finished manufactures were issued by the Commerce Department and 37 percent of them relied, at least in part, on constructed value as opposed to 29 percent which relied on third country sales. Surrogate sales approach was reserved to NME countries such as China, which formed only 6.7 percent of the total (Clarida, 1996: 365-370).

A more recent data from 2010-2016 shows that out of a total of 487 original investigations, authorities relied at least partly on constructed value for almost 29 percent of the cases, while normal value based on sales to third country market was
relied upon in only 4.7 percent of the cases. At the same time, application of the NME methodology consistently increased from 27 percent in 2010 to 32 percent in 2016, which is a testimony to increasing antidumping actions against China. (see Table 1). It is difficult to measure how many of the investigations relying upon constructed value were PMS cases. Although a full sample of PMS investigations in the US is not available to the author, there have been several important PMS cases in the US, from which one can discern some established standards by which the US antidumping authorities applied the PMS provision.

### Table 1. Frequency of Normal Value Calculation Method Used

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Investigations</th>
<th>HM</th>
<th>CV</th>
<th>COP</th>
<th>NME</th>
<th>TM</th>
<th>FA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>38</td>
<td>10</td>
<td>2</td>
<td>11</td>
<td>27</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>29</td>
<td>12</td>
<td>7</td>
<td>8</td>
<td>15</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>38</td>
<td>12</td>
<td>6</td>
<td>13</td>
<td>19</td>
<td>1</td>
<td>9</td>
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<td>60</td>
<td>26</td>
<td>23</td>
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<td>34</td>
<td>26</td>
<td>8</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>88</td>
<td>39</td>
<td>37</td>
<td>24</td>
<td>23</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>129</td>
<td>65</td>
<td>36</td>
<td>59</td>
<td>32</td>
<td>0</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>487</td>
<td>209</td>
<td>141</td>
<td>170</td>
<td>161</td>
<td>23</td>
<td>66</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:** HM: Home Market, TM: third country market, CV: constructed value, COP: cost of production analysis, NME: non-market economy, FA: use of facts available (usually facts supplied by the petitioner), NA: statistics not available or not collected.

**Source:** Author calculation based on US submission of Semi-Annual Report of Anti-Dumping Actions to the WTO, 2010-2016.

## VI. MAJOR CASES CONCERNING PMS IN THE US

Initially, the author searched the US Federal Register and the internet home page of the Department of Commerce with key words such as “particular market situations” and “particular market situation allegations” to find the most recent PMS cases. Documentation on preliminary and final determinations or decisions were retrieved from the Federal Register Website (https://www.federalregister.gov/public-inspection/current) and the Enforcement and Compliance site (http://enforcement.trade.gov/frn/)
for the initial list of searched cases, which provided the lead to earlier cases that were cited as precedents. Examination of some of these significant cases for which there was information show that a wide range of circumstances, from “incidental markets” or lack of an established market and differences in quality, to government intervention were found to constitute PMS.

In the *Fresh Kiwifruit from New Zealand (1996)*, the petitioner claimed that the New Zealand Kiwi Marketing Board (NZKM) came to be established as the exclusive exporter of export quality kiwifruit from New Zealand, and that New Zealand has been a “dumping ground” for production that could not be sold in export markets, driving down domestic prices, giving rise to precluding proper comparisons between New Zealand sales and US sales.15

Defendants countered that the home market was viable because it exceeded the 5 percent threshold rule. It was argued that the exception to the rule is for “particular market situations” which only exist where a single sale in the home market constitutes five percent of sales to the US or there is government control over pricing to such an extent that home market prices cannot be considered to be competitively set, or where demand patterns in the US and in the foreign market were different.

In this case, the Department of Commerce (DOC) used constructed normal value, not on the basis of PMS, but on the basis of “less than cost sales.” The home market clearly met the five percent threshold test for market viability, but after applying the below-cost test, substantially more than 80 percent of the home market sales were found to be sold at prices below the cost of production for an extended period of time, which would not permit the recovery of all costs within a reasonable period of time. A PMS would warrant a departure from the normal 5 percent test, but based on the evidence on the record, the DOC did not find PMS to exist. The position of the DOC was that the petitioner did not demonstrate that kiwifruit NZKB sold in export markets were of higher quality than those sold in the home market. Further, the fact that NZKB is a dominant exporter by itself did not establish that there were price controls in the kiwifruit market or that NZKMB is the exclusive exporter from New Zealand. On the contrary, resellers were permitted to sell in other markets if they were licensed by the NZKMB. Thus export markets and export pricing were

15 Fresh Kiwifruit from New Zealand; Final Results of Antidumping Administrative Review, 61 FR 46438 (September 3, 1996), Comment 3. All information pertaining to each case comes from the documents quoted in the footnotes for all following antidumping review cases.
not subject to absolute control and manipulation by the NZKMB. Even if it were in a position to manipulate export prices, there was no evidence showing that the NZKMB acts on behalf of the New Zealand government to control prices in the home market. Therefore, evidence of price control presented by the petitioners was not considered to be sufficient to satisfy the PMS standards under the law. According to the DOC, a finding of sales below cost of production does not, in and of itself, establish that a “PMS” exists. As to what might constitute a PMS, the DOC agreed with the defendant, referring to the SAA that accompanies the URRA at 822, which establishes that a “particular market situation” might exist where 1) a single sale in the home market exceeds the quantitative viability threshold, 2) there is government control over pricing to such an extent that home market prices cannot be considered to be competitively set, or 3) there exists differing demand patterns, even though the language of the SAA does not limit the range of PMS to such examples.

*Certain Durum Wheat and Hard Red Spring Wheat from Canada (2003)*\(^{16}\) is another case that dealt with a government entity, Canada Wheat Board (CWB). CWB is a government controlled monopoly buyer and seller of wheat in the Canadian domestic market. The PMS allegation was made on the basis of government’s price control. It was claimed that the heavy regulation of the rail system on the part of the Canadian government allowed CWB sufficient power to control cost of freight, which forms a large component of wheat price, inhibiting competitive pricing. At the same time, numerous non-tariff barriers protected the Canadian wheat market, and government guarantee of the survival of the milling industry, gave additional support to the industry.

However, the DOC determined that the evidence on PMS was insufficient. While accepting the fact that CWB is a government entity having monopoly, it did not consider its control so extensive that prices could not be considered to be competitively set. DOC required that even where there is evidence of government control, there must be substantial evidence that such control is so extensive that prices are not competitively set. This decision was made even in the face of a

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concurrent countervailing subsidy investigation which found government subsidy to exist in the final determination.\textsuperscript{17}

Similarly, the DOC required high standard of evidence in the \textit{Certain Cold-Rolled and Corrosion Resistant Carbon Steel Flat Products from Korea} (1997).\textsuperscript{18} Petitioners argued that PMS existed in the Korean steel market because the steel prices were controlled \textit{de facto} by the government, given the circumstantial evidence, independent third party sources, and analysis of price movements. Since home market sales were not viable, and too late to collect third country sales data, it was argued that constructed value should be used, and further, constructed value calculation should not use actual profit realized on sales in Korea but facts available (ie, facts provided by the petitioners), because Korean market profit information did not reflect true market prices.

The DOC was not persuaded by this argument. According to the DOC, there was no “convincing evidence” that PMS existed. Even though the DOC agreed that there was substantial government influence, it was not “to such an extent as to preclude a proper comparison.” The DOC argued that government policies that influenced market prices such as prior approval ended during 1981-1993, before the period under review. Moreover, neither did verification of circumstantial evidence and independent reports show existence of government controls. While the petitioners argued that flat steel prices were an indication of government control, the DOC countered that flat prices do not necessarily show price control since it is not inconsistent with expected price trends in an oligopolistic market such as the Korean steel market. Further, there was evidence of price competition through discounts, credit adjustments, and freight equalization. This case therefore, set a high standard for government control criteria to constitute a PMS.


\textsuperscript{18} Certain Cold-Rolled and Corrosion-Resistant Carbon Steel Flat Products From Korea: Final Results of Antidumping Duty Administration Review (Cold-Rolled from Korea) 62 FR 18404 (April 15, 1997).
In the two cases *Fresh Atlantic Salmon from Chile (1998)*, and *Certain Frozen Warmwater Shrimp from Ecuador (2006)*, the DOC found PMS to exist on the grounds of domestic markets being “incidental” to export markets. In the *Salmon-Chile* case, the DOC concluded that the home market was incidental to the Chilean salmon industry, which was primarily export-oriented. The home market was comprised almost exclusively of salmon graded as “industrial” or “reject,” which were sold locally for drastically reduced prices compared to export merchandise. The “perfunctory marketing and distribution of salmon” in the home market was also consistent with the incidental nature of those sales. Upon verification of submitted evidence, the DOC refuted the claim that the difference between the home market and the US were only one of differences in product mix. The DOC argued on the contrary that the difference was one of quality, which was large enough to make domestic sales impossible to compare with US sales.

Similarly, the DOC determined that home sales were incidental to the export market in the *Shrimp-Ecuador* case, due to low quality of products sold in the domestic market, rendering the Ecuadorian market inappropriate for determining the normal value. In the absence of any third-country sales, the DOC used constructed normal value. One of the defending firms argued that its sales of shrimp in the home market were of export quality, unlike the home market sales of other respondents who were found to be selling at prices below cost. However the DOC’s position was that several factors, in addition to quality, contributed to the finding of PMS. The finding of PMS was based on “the totality of the record evidence,” and that “no one factor is dispositive.” While it is not very clear from the document what these other factors were, DOC continued to find that the defendant’s home market sales were of products left over from the US sale transaction, and sold on sight at the plant. The home market sales were therefore regarded as incidental to its principal business of selling to the US market.

19 “Notice of Final Determinations of Sales at Less than Fair Value: Fresh Atlantic Salmon from Chile.” 63 FR 31411 (June 9, 1998), Comment 4.

Interestingly, in the *Large Power Transformers (LPTs) from the Republic of Korea (2016)*, it was responding firms and not petitioners who invoked the PMS criterion to argue for using constructed normal value, as in the *EC-Cotton GATT* dispute. They contended that LPTs are highly specialized, large capital goods that are customized to unique customer specifications and therefore did not permit proper price-to-price comparisons. They argued that in other antidumping investigations, it was DOC practice to resolve the problem of each sales being unique by relying on constructed value rather than model matching as it did in this review. DOC countered that it was DOC practice not to use constructed value where possible, and that it was proper to use price-to-price comparison through model matching based on physical characteristics. It was argued that constructed value should be relied on only when comparisons were unreasonable and unable to find a proper match. Further, the cases the defending firm referred to were all significantly different from the LPT case, especially because they far exceeded the degree of customization compared to LPTs.

*Certain Oil Country Tubular Goods (OCTG) from the Republic of Korea (2017)* is the first PMS case quoting the TPEA and so it sets an important precedent with respect to what concepts and types of analysis would be necessary to address future allegations of PMS under the amended Sec 773(e), which allows using alternative methodology for calculating the normal value “if PMS exists such that the cost of materials and fabrication or other processing of any kind does not accurately reflect the cost of production in the ordinary course of trade.”

In this case, PMS was alleged to affect the cost of production in Korea on four accounts: 1) the distortion of OCTG costs caused by imported Chinese hot-rolled steel, 2) the Korean government subsidy to domestic production of hot rolled steel, a major input for OCTG, 3) distortion of hot rolled steel costs caused by strategic alliance between hot rolled coil suppliers and OCTG producers, and 4) the Korean government involvement in Korean electricity pricing. In the preliminary review of 2016, the DOC was not convinced that there was sufficient evidence of PMS in

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the input market when the four allegations where considered individually, and no PMS was found to exist. This was overturned in the final decision, resulting in higher dumping margins.

The DOC argues in the final decision that when the analysis was refocused on the totality of the conditions in the Korean market, the allegations represented facets of a single, particular market situation, having cumulative effects. However, it seems that the DOC primarily focused on the distorted prices in the input market to be the main culprit constituting PMS. According to the DOC, subsidies received by Korean hot-rolled steel producers totaled up to 60 percent of the cost of hot rolled steel, which at the same time constituted around 80 percent of the cost of OCTG production. Without conducting a separate analysis as to whether the subsidy to inputs was passed on to the final product and interfered in the competitive price setting in the final product market, the DOC took presence of subsidy to be sufficient evidence of competitive benefit to the OCTG market. The petitioner went as far as to point out that the PMS provision “… is not a subsidy provision that requires a finding of financial contribution and specificity to benefit solely the Korean OCTG industry to distort cost of production of OCTG. The particular market situation provision has no requirement that subsidies only affect those inputs that were used to produce Korean OCTG.” This contention was not directly refuted in the declaration of DOC’s position. That is, the new PMS provision is seen to obviate the need to conduct any pass through analysis, or the obligation to meet WTO consistent definition of subsidy.

The DOC quantified the impact of distortion by making an upward adjustment, equal to net domestic subsidization rate (ie, the countervailing duty rate less all export subsidies), to the respondent firms’ reported cost of hot rolled coil. The adjustment rate was based on the subsidy rates found for POSCO and all other producers of hot rolled steel in the final determination in *Hot-Rolled Steel Flat Products from Korea (2016).* All the other three factors (imported Chinese hot rolled steel, strategic alliance, government involvement in the electricity market) were argued to have exacerbating effects on such downward price distortion in the input market, although the impact of these remaining factors could not be quantified. The DOC noted that imported Chinese steel products placed downward

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pressure on Korean domestic steel prices, although this was not a unique situation for the Korean market. Therefore, this by itself would not constitute a PMS, but it helped to intensify the impact of PMS found to exist resulting from input subsidies effects. Although admitting that there is no specific evidence of direct relationship between the alleged strategic alliance and hot-rolled steel pricing during the period of review, the DOC speculated that in general, “strategic alliance between HRC producers and OCTG producers may also have affected prices.” While carefully declaring that the determination of PMS was not based “solely upon any support from the government of Korea for electricity,” the DOC is now inclined to believe that, because electricity in Korea “functions as a tool of the government’s industrial policy,” and that because the largest electricity supplier, KEPCO is a government controlled entity, government control must be so extensive as to prohibit competitive price setting, even though the extent of control could not be quantified. Although making a decision on the basis of the totality of evidence is not unprecedented in PMS analysis (as can be seen in the earlier US DOC decision in the Shrimp-Ecuador case, for example), collectively considering individual factors that are not supported by strong evidence does not seem to be a very persuasive grounds on which to make a PMS decision. All of this indicates that a much lower standard of evidence has been applied to the OCTG case compared to the pre-TPEA cases.

Most importantly, the DOC made its position clear about the legal interpretation of the amendments contained in the TPEA. The DOC agreed with the petitioner that Section 504 of the TPEA enables the DOC to address a particular market situation in the input market. The DOC states that “Section 504 of the TPEA added the concept of particular market situation in the definition of the term “ordinary course of trade,” for purposes of constructed value under section 773(e) and through these provisions for purposes of the cost of production under section 773(b)(3).” As explained above, section 773(e) allows the investigating authority to “use another calculation methodology under this subtitle or any other calculation methodology” if PMS exists such that “the cost of materials and fabrication or other processing of any kind does not accurately reflect the cost of production in the ordinary course of trade.”

PMS allegations were made in two other antidumping cases following the OCTG, but neither of them has yet reached the final determination stage. In the Certain Softwood Lumber Products from Canada (2017), it was claimed that government support in the downstream markets (eg energy programs
The foregoing discussion shows that in general, PMS allegation has not been common in US practice before the TPEA amendment. Although no attempt was made to acquire a complete sample of cases involving PMS cases, given the total number of antidumping investigations taken each year in the US, only a handful of cases with meaningful information regarding PMS could be found. The cases examined in this paper show a clear break since the introduction of the TPEA amendments. The US practice can generally be characterized as follows:

1) Since there has been no clear definition of PMS until recently, relevant US laws did not set specific limit to the scope of PMS. A wide range of situations were found to constitute PMS, and of these, thin markets (for various reasons) and government controls were the most frequently sited.

2) A fairly high standard of evidence was required to find PMS before the 2015 TPEA amendments. In the cases where government intervention was alleged to distort prices, mere existence of government control or monopoly was not enough to determine PMS. The control had to be extensive enough to preclude competitive pricing, which in turn would prevent comparison with export price. In the case of thin markets, for example due to customization of products, the extent of customization had to be so great as to preclude comparison through model matching. Clearly, the standard for triggering the PMS criterion is that there must be impact and that comparability is affected, consistent with what has been established in the EC-Cotton Yarn GATT dispute.

3) The 2015 TPEA amendments make a clear break from the past practice. The intention of making an explicit definition of PMS as sales outside the ordinary course of trade is clearly to include situations of input market distortions.
explicitly. This allows the use of not only surrogate prices for the product under the antidumping investigation but also surrogate prices for inputs (ie, surrogate costs). Further, the standard of evidence to require finding of PMS seems to have been diminished, as can be seen in the OCTG case. In the OCTG case, presence of subsidy for a major input was almost automatically taken to constitute PMS. Neither effects on competitive pricing of the final product nor effect on comparability was seriously considered. In light of the EU-Biodiesel WTO dispute, such a decision would not be considered to be WTO consistent. The AB report clearly states that costs used to calculate the constructed normal value should reflect the “actual costs” of the producer, retaining the distortion caused by the PMS, and not the cost that the investigating authority thinks is reasonable. In fact, the authority should make adjustment to restore the distortion if other than producer’s actual costs are used. This is to enable proper comparison with export price, since the exported products would have been produced with the same “distorted” costs. Unless the exported price is also adjusted upwards, the elimination of distortion would not facilitate but rather interfere with proper comparison. Whether the OCTG decision is an aberration, or sets a future trend leading to a more frequent PMS findings (enabling the use of constructed prices and surrogate costs), is still to be seen.

V. CONCLUSION

Recently, “particular market situation,” defined frequently as government control preventing competitive pricing, is increasingly invoked to trigger the use of constructed normal value in antidumping investigations. This phenomenon is closely related to the debate on the status of China’s economy. The presumption of NME status under China’s Protocol of Accession had allowed importing countries to apply the so called NME methodology until December 2016. Some scholars point out that once China gains market economy status, the PMS provision could serve as a convenient tool to continue NME methodology against China, but then, applying PMS to market economies to enable the use of surrogate costs would be abusing the WTO rules. They therefore call for establishing a clearer standard for interpreting and applying the PMS provision.
Although PMS is not clearly defined in the ADA, the foregoing discussions show that a reasonable interpretation of the ADA and GATT/WTO jurisprudence provides for some general standards by which PMS can be interpreted:

1) Scope/reach: there is no clear limitation on the kind or type of situations that can be regarded as constituting PMS, as long as the situation has an impact on the price of the product under question. Therefore, this does not necessarily exclude government intervention or policies that affect prices, whether in regards to the product market or the input market. Allowing for such a broad interpretation of the scope can be a source of ambiguity and contention.

2) Triggering condition: the existence of the PMS by itself does not trigger the PMS criterion. The triggering condition for using constructed cost is that first of all the PMS must have an impact on the price, and second, the extent of such impact must be so great as to make proper comparison with export price inappropriate.

3) Function: The PMS provision allows investigating authorities to use third country sales or costs as normal value. Under such circumstances, the costs used to construct the normal value must be those from the producer’s records and from the originating country. Information from other countries can be used, but if so, they must be adjusted back to reflect the conditions prevailing in the originating country. That is, the authorities are limited in the use of surrogate costs to construct the cost of production, in a way as to eliminate the distortion claimed to be created by the PMS. It is the comparability of prices that should be ensured, not the “reasonableness” of prices.

A critical examination of relevant US laws and antidumping cases reveal that there is a major change in the US practice in 2015 with the passage of the TPEA amendments regarding PSM. Before the change in law, invoking PMS criterion was rare and even though US has always regarded government control as one of the major circumstances constituting PMS, a high standard of evidence was required to find PMS. Such US practice seems to have been consistent with WTO ADA provisions and the WTO/GATT jurisprudence discussed above.
Significant changes occurred with the enactment of the TPEA. The TPEA amendments have explicitly defined PMS as a transaction that is “outside the ordinary course of trade,” and widened its scope to include price distortions (due to government control or interventions such as subsidies) in the input market as well as the market of the product under investigation. The significance of the change does not come from making the definition explicit, but in allowing the use of any methodology to construct normal value in such cases, including the use of surrogate costs, normally only used against NMEs. The motivation of the US amendments in the wake of China’s possible graduation from NME status seems to be akin to that of the EU, when it adopted the Basic Regulation Article 2(5), evidently to address the issue of input price distortions when Russia gained market economy status. More worryingly, recent examples indicate that such deviant use of PMS may be widely invoked against any market economies.

Accumulating WTO jurisprudence of the EU-Biodiesel kind is useful, but it would not fundamentally solve the core problem of PMS. The PMS problem is a continuation of an old debate about “input dumping.” As negotiation history shows, “input dumping” was raised as a problem since the Uruguay Round, and US position in the DDA has evidently turned away from conceptualizing dumping as price discrimination or predation to one of distortingive government policies, including input subsidies. As long as there are countries which regard that state intervention is a strong force distorting input prices and that it is a problem to be reckoned with by trade policy, the PMS problem will not go away. It is not enough to criticize abusing PMS as a convenient replacement of NME methodology, or a back door to curtailing “input dumping,” which may be better remedied through other provisions. The underlying problem cannot be resolved by just disputing calculation methodology under the current rules of the ADA. A more fundamental approach would be to face the issue of “input dumping” more squarely in the face and begin the process of more clearly conceptualizing dumping, input dumping, PMS, and purposes of antidumping. This would lay down the basis on which a negotiation can take place to make up new rules in this area. Nothing less than a complete overhaul of the trade remedy rules of the WTO, encompassing countervailable subsidies, antidumping and safeguards, as well as consideration of competition policy, would be necessary. This is obviously a tall order and is beyond the scope of this paper. The purpose of this paper is not to provide a comprehensive critique of the current trade remedy rules or to offer any suggestions for alternative reforms.
Neither is it the purpose of this paper to give a systematic critique of the US antidumping practice overall. The purpose of this paper is to try and identify the core issue underlying the recently emerging discussions related to PMS. It is found that the real problem is not interpretive or technical one about calculation methodologies, but a conceptual one about input dumping and how it should be dealt with, and more broadly, clarifying the concept of dumping and purpose of antidumping.

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First version received on 9 September 2017
Peer-reviewed version received on 18 September 2017
Final version accepted on 25 September 2017

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Valuing Attributes of Fluid Milk in Laos*

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This study estimates the random utility function of fluid milk using 1,165 survey responses in Laos. It finds that both products’ attributes and individual characteristics affect consumers’ preference for the milk and the hypothetical brand of Laos-Korea has a potential compared to four real dairy products. Results also show that calories have a positive relationship with consumer’s preference while the price and fat content have a negative one. The decision for choosing each brand is significantly affected by individual characteristics such as gender, age, whether or not respondents live with their children, the level of education, income, the frequency of purchasing milk per week, and the region where they live. The preference for five brands appears in the order of Foremost, Nabong, Thai-Danish, Meiji, and Lao-Korea, and probabilities of purchasing each brand at the mean level are 30.9%, 17.48%, 21.48%, 15.0% and 10.39%, respectively. Nabong that was Lao national milk brand still has a significant market power even though it was closed in 2008. The policies to promote milk industry by implementing its national milk brand again would be more effective if it focuses on the young generation, female consumers, families with children, quality of dairy products, and Vientiane capital areas.

Keywords: Laos, Consumer Preference, Fluid Milk, Conditional Logit, National Brand

JEL Classification: Q18, D12, Q13

* This paper was supported by Creative-Pioneering Research Program through Seoul National University (SNU).
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ⓒ Korea Institute for International Economic Policy
I. INTRODUCTION

The Lao People’s Democratic Republic (Laos) is one of the most underdeveloped countries in Asia, and the lack of nutrients has been continuously issued throughout the National Socio-Economic Development Plan (NSEDP). In 2012, for instance, 27% of children under five years old showed a low level of body weight while 44% has malnutrition due to undernourishment according to the World Health Organization (WHO) and the Ministry of Health (MOH) of Laos. The 8th NSEDP (2016-2020) emphasizes on providing food supplements including milk to children at schools as well as promoting value-added livestock industry (MPI, 2015). Previously, Lao government had managed the national milk brand, Nabong, to boost its milk industry but it failed due to lack of business capacity in 2008. Understanding consumers’ preference for dairy products can be useful for enhancing business capacity when Lao government considers its national milk brand again as a public business sector in the future.

On the other hand, one early study indicates that national brand is reflected and changed over time through product image (Nagashima, 1977). The national brand image usually depends on the culture which incorporates economic development, education, economic size, population, and political situation (Forgas and O’Driscoll, 1984). As many projects from international donors, so called, official development assistance (ODA) has been actively undertaken, such activity can play a significant role in creating donors’ brand image to consumers. That is, ODA can be linked with private sectors that want to promote their market capacity to other countries. An empirical study (Kim and Lee, 2010) has also proven to have positive effects of ODA on the formation of Korean national brand especially with the intention to visit Korea and purchase Korean products from recipient countries.

The primary purpose of this research is to find out which factors can affect significantly on consumers’ behavior of buying milk products using brand images with basic information including price, calories and fat content, which has never been done before in Laos. More specifically, it estimates the value of attributes of fluid milk and consumers’ characteristics comparing four real products (Foremost, Nabong, Thai-Danish, and Meiji) to one hypothetical product (Laos-Korea) assuming that the willingness to pay for the one would reveal a latent brand power of Korea in Laos. Also, the study can touch on indirect effects of Korea’s aid to Laos by
adding the name of Lao-Korea in milk brands and comparing it with other milk brands existed in the current market.

It can be essential and needed for developing dairy industry by focusing on demand side so that this study explores factors affecting consumers’ decision on milk products through market research in Laos. There is similar market research of finding factors for dairy products. Turkey, for instance, where most households consume raw milk, researchers find that the income and education have a positive relationship with the consumption of pasteurized milk, that is promoted by the government while the number of households and age of household head have a negative one (Tiryaki and Akbay, 2010). In the region of Qingdao in China, consumers prefer pasteurized milk to low-fat milk and low-fat milk to fresh milk. There are four important attributes such as butterfat, processing methods, tastes and prices for purchasing dairy products, and female consumers like raw milk compared to males, and the old is more sensitive to the fat contents than the young (Bai et al., 2007). Therefore, Understanding Lao consumers’ recognition of milk brands including its national brand, Nabong, that is not available in the current market can be substantial if Lao government retries to have its national milk brand again in the market.

To respond to this research agenda, major factors that affect consumers’ preference for dairy products are examined first by implementing the pretest based on previous literature. Preparing survey questionnaires considering price endogeneity problem and communicating with Lao customers is essential for collecting reliable data. Thus, a randomized block design for levels of attributes and research cooperation with National University of Laos (NUOL) has been done in advance and then survey is implemented in three big cities such as Vientiane, Luang Prabang, and Pakse.

The main finding is that the price, the brand, the amount of calorie and butterfat content are the most important factors when consumers decide to purchase fluid milk in Laos, which is similar to previous research (Bai et al., 2007; Tiryaki and Akbay, 2010). Lao consumers prefer existing brands to a hypothetical one in the order of Foremost, Nabong, Thai-Danish, Meiji, and Lao-Korea. Moreover, previous national brand, Nabong still has a market power. This study has its uniqueness in a sense that it provides parts of fluid milk information and consumers’ awareness of their dairy products in Laos.

This paper is organized as follows. First, the survey design is explained with attributes and levels of factors for dairy products including random block assignment.
Second, survey procedure and questionnaires are studied including summary statistics. Third, results from conditional logit estimation will be discussed with probabilities of buying each brand at the average level. Finally, policy implications to promote milk business by Lao government will be suggested to speed up its national goals for achieving economic development.

II. SURVEY DESIGN AND DATA DESCRIPTION

1. Survey Design

Based on in-depth interviews with the sale staffs on the market in the Vientiane capital in the spring of 2015, there are three popular milk brands, which are the Foremost, the Thai-Danish, and the Meiji, and all are imported from Thailand. Consumers in Laos are still aware of their national dairy brand of Nabong even though it was closed in 2008 since it had been marketed for more than ten years. The Lao-Korea is the hypothetical milk brand that is assumed to have a potential brand power resulted from Korea’s aid activities in Laos. As a result, five milk brands are compared with one another for valuing attributes of fluid dairy products as well as consumer’s characteristics.

The prior 127 consumers’ survey conducted in May 2015 results in 4 superior attributes, namely, brands, prices, calories, and butterfat in the order of importance among ten possible attributes of milk products. Comparing prices to calories, men prefer prices to calories while females prefer calories to prices on average. However, there is such a limit as the high participation rate of those between 15 and 19 years old and those in their 20s in the previous survey. Contrary to consumer’s preference of milk-processing method in China done by Bai et al. (2007), Lao consumers do not consider that they distinguish the sterilized milk from the pasteurized milk since most products are sterilized milk with a long shelf life in Laos due to the lack of the cold chain management.

As shown in Table 1, five levels for each attribute are considered based on the results of the pretest. For the choice experiment, total combinations of three attributes with five levels are 125 profiles \((5^3)\) in the full factorial design assuming
the brand being fixed in the questionnaire. Price ranges from 2,000 to 6,000 kip\(^1\) for one small pack, a calorie from 110 kcal to 190 kcal per a pack, and butterfat 0 g to 15 g per a pack. One small box of sterilized milk contains 200 ml in general in Laos.

Table 1. Attributes and Levels in Choice Experimental Design

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price (kip/a pack)</td>
<td>2,000, 3,000, 4,000, 5,000, 6,000</td>
</tr>
<tr>
<td>Calorie (kcal/a pack)</td>
<td>110, 130, 150, 170, 190</td>
</tr>
<tr>
<td>Butterfat (g/a pack)</td>
<td>0, 4, 8, 12, 15</td>
</tr>
</tbody>
</table>

Blocking is one way of reducing total questions for each respondent without losing essential information from respondents since blocks are balanced partitions of choice questions usually with equal size focused on main effects, and it can eventually increase response efficiency (Johnson et al., 2013). Block randomization as one of a fractional factorial design can reduce sampling variability and ensure subgroups being available for separate analysis (Gerber and Green, 2012). For this survey in Laos, only ten questions are asked with the block randomization to keep their concentration on the survey.

There are five blocks as the minimum since it has complete 125 designs and only two blocks are used for this research shown in in Table 2. One possible limitation using two blocks would be over or under estimation of willingness to pay for each brand since it does not consider perfectly balanced design for each brand. However, it can still provide useful information regarding consumer’s preference for each brand since it follows the random block assignment. For instance, the average price is 4,000 kip, average fat is 7.8 g and an average calorie is 150 kcal for both block A and B, which indicates that overall dispersion is quite balanced within the block at the mean level. When it comes to 10 questions for each person, the average price for Foremost, Nabong, Thai-Danish, Lao-Korea, and Meiji are 3,700, 4,200, 4,100, 4,100, and 3,900 kip, respectively, which is slightly different from the average but still within a certain range.

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\(^1\) 8,000kip corresponds to USD 1$ approximately.
<table>
<thead>
<tr>
<th>Attributes</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block A</td>
</tr>
<tr>
<td>Foremost</td>
<td>1</td>
</tr>
<tr>
<td>Price</td>
<td>2,000</td>
</tr>
<tr>
<td>Fat</td>
<td>0</td>
</tr>
<tr>
<td>Calorie</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Price</td>
<td>4,000</td>
</tr>
<tr>
<td>Fat</td>
<td>4</td>
</tr>
<tr>
<td>Calorie</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Price</td>
<td>4,000</td>
</tr>
<tr>
<td>Fat</td>
<td>8</td>
</tr>
<tr>
<td>Calorie</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Price</td>
<td>2,000</td>
</tr>
<tr>
<td>Fat</td>
<td>4</td>
</tr>
<tr>
<td>Calorie</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Price</td>
<td>5,000</td>
</tr>
<tr>
<td>Fat</td>
<td>4</td>
</tr>
<tr>
<td>Calorie</td>
<td>4</td>
</tr>
</tbody>
</table>

| Nabong    |           |           |
| Price     | 4,000     | 6,000     |
| Fat       | 0         | 0         |
| Calorie   | 170       | 150       |
|           | 3         | 4         |
| Price     | 6,000     | 3,000     |
| Fat       | 8         | 4         |
| Calorie   | 190       | 190       |
|           | 5         | 6         |
| Price     | 3,000     | 2,000     |
| Fat       | 12        | 15        |
| Calorie   | 170       | 150       |
|           | 7         | 8         |
| Price     | 5,000     | 4,000     |
| Fat       | 4         | 15        |
| Calorie   | 190       | 150       |
|           | 9         | 10        |
| Price     | 6,000     | 2,000     |
| Fat       | 8         | 12        |
| Calorie   | 170       | 110       |

| Thai-Danish|           |           |
| Price     | 3,000     | 5,000     |
| Fat       | 0         | 4         |
| Calorie   | 110       | 130       |
|           | 4         | 12        |
| Price     | 5,000     | 3,000     |
| Fat       | 12        | 15        |
| Calorie   | 130       | 170       |
|           | 6         | 12        |
| Price     | 3,000     | 6,000     |
| Fat       | 0         | 0         |
| Calorie   | 190       | 170       |
|           | 15        | 15        |
| Price     | 4,000     | 2,000     |
| Fat       | 15        | 15        |
| Calorie   | 150       | 110       |
|           | 8         |
| Price     | 2,000     | 6,000     |
| Fat       | 0         | 15        |
| Calorie   | 110       | 170       |
|           | 4         | 12        |
| Price     | 6,000     | 3,000     |
| Fat       | 15        | 12        |
| Calorie   | 170       | 130       |
|           | 12        |
| Price     | 3,000     | 4,000     |
| Fat       | 8         | 12        |
| Calorie   | 110       | 110       |
|           | 12        |

2. Survey Procedure and Questionnaire

The survey was carried out between July 8th and August 18th, 2015 by targeting total 1,200 people with 400 people in each of the three biggest cities, Vientiane, Pakse and Luang Prabang in Laos supported by the students from the college of agriculture at National University of Laos (NUOL).

Each question has six choices with four real brands, one hypothetical brand, and the case of not choosing any name shown in figure 1. The order of each brand is identical for all respondents, and the level of attributes for each brand is changed based on the random assignment from Table 2. Since the milk size is the same for each brand, a typically sterilized milk with the size of 200 ml is assumed. Price
information is right above the check box considering that consumers’ final decision would be much more affected by price information than the others such as fat and calorie content. Here, both Nabong and Lao-Korea are not in current market while Nabong was Lao national milk brand before. Lao-Korea is the hypothetical one that is assumed to have a potential brand power from the bilateral cooperation between Korea and Laos.

Figure 1. An Example of Survey Questionnaire for Milk in Laos

<table>
<thead>
<tr>
<th>Q.1</th>
<th>None:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foremost</td>
<td>I Would not Purchase any of these Products</td>
</tr>
<tr>
<td>Nabong</td>
<td></td>
</tr>
<tr>
<td>Thai-Danish</td>
<td></td>
</tr>
<tr>
<td>Lao-Korea</td>
<td></td>
</tr>
<tr>
<td>Meiji</td>
<td></td>
</tr>
<tr>
<td>Fat: 0g Kcal: 110</td>
<td>2,000 kip</td>
</tr>
<tr>
<td>Fat: 0g Kcal: 170</td>
<td>4,000 kip</td>
</tr>
<tr>
<td>Fat: 8g Kcal: 110</td>
<td>3,000 kip</td>
</tr>
<tr>
<td>Fat: 12g Kcal: 150</td>
<td>3,000 kip</td>
</tr>
<tr>
<td>Fat: 12g Kcal: 110</td>
<td>5,000 kip</td>
</tr>
</tbody>
</table>

3. Demographics and Consumer’s Profile

Table 3 provides summarized statistics for necessary information obtained from the survey. A total 1,165 respondents participated in the survey. There are total 69,900 observations since each consumer responds to 10 questions with six choice options. There are three attributes which include the price, the calorie and the butterfat as well as individual characteristics such as gender, age, whether or not to have kids in their family, the level of education and income, previous consumption behavior, and location where respondents are living. For the gender, 36% of those participants are men while 64% are women. The average age of participants is 24.4 years, and people in their 20s are about 50%, and those in 30s are 21.5%. Respondents living with their children under the age of 12 are 59%. Also, 81% of the interviewees

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2 Data that we used comes from previous research (Kim and Lee, 2015) and it is re-evaluated by new methodology, which provides both products’ attributes and consumers’ characteristics more suitable than before.
are graduated from high school. The average income ranges from 500,000 to 1,000,000 kip and most people purchase milk once a week on average.

Table 3. Summary Statistics for Survey Respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of Observation</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Products Attributes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brand (1 for Foremost, 2 for Nabong, 3 for Thai-Danish, 4 for Lao-Korea, 5 for Meiji, 6 for None)</td>
<td>69,900</td>
<td>3.5</td>
<td>1.7078</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Price (1,000 kip) (0, 2, 3, 4, 5, 6)</td>
<td>69,900</td>
<td>3.3</td>
<td>1.9720</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Fat (g) (0, 4, 8, 12, 15)</td>
<td>69,900</td>
<td>6.5</td>
<td>5.7082</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Calories (kcal) (0, 110, 130, 150, 170, 190)</td>
<td>69,900</td>
<td>125</td>
<td>61.5769</td>
<td>0</td>
<td>190</td>
</tr>
<tr>
<td><strong>Respondents’ Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (1 for male, 0 for female)</td>
<td>69,840</td>
<td>0.36</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Age (1 for 10s, 2 for 20s, 3 for 30s, 4 for 40s, 5 for 50s, 6 for 60s)</td>
<td>69,600</td>
<td>2.44</td>
<td>1.04</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Kid (1 for household having kids, 0 otherwise)</td>
<td>69,540</td>
<td>0.59</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Education (1 for completing secondary school, 0 otherwise)</td>
<td>69,180</td>
<td>0.81</td>
<td>0.39</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income (1 for less than 500,000, 2 for ≥ 500,000 and &lt; 1,000,000, 3 for ≥ 1,000,000 and &lt; 1,500,000, 4 for ≥1,500,000 and &lt; 2,000,000, 5 for ≥ 2,000,000 and &lt; 2,500,000, 6 for ≥ 2,500,000 and &lt; 3,000,000, 7 for more than and equal to 3,000,000)</td>
<td>69,720</td>
<td>2.80</td>
<td>1.82</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Milk Consumption Frequency (0 for rare purchase, 1 for 1-2 times per week, 2 for 3-4 times per week, 3 for 5-6 times per week, 4 for daily purchase)</td>
<td>69,720</td>
<td>1.09</td>
<td>1.24</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Region (1 for Vientiane, 2 for Pakse, 3 for Luangprabang)</td>
<td>69,900</td>
<td>1.9871</td>
<td>0.8208</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

The survey was carried out by having 400 people in each of the three cities with the target of 1,200 respondents in total. However, 20 errors occurred in Pakse, and 15 errors occurred in Luang Prabang.

Table 4 shows the selected frequencies of each brand from 1,165 respondents. Since ten questions were given to each person, the total frequencies would be 11,650. In the case of the frequency, Foremost shows the highest rate of 29.73%, followed by Thai-Danish (22.09%), Nabong (15.92%), Meiji (15.35%), and Laos-Korea (10.39%) given the level of attributes shown in Table 4.
Since this research is based on the survey result of three big cities in Laos, comparing overall selected frequencies from Table 4 with real market share would be needed for the reliability of the survey. However, the current market information in Laos is not available so that conjecturing total selected frequencies with existing brand power in Thailand would be an alternative way since Thailand and Laos share a cultural and linguistic proximity even in the milk sector (Phoutthakeo et al., 2014).

According to the 2015 study about liquid milk with 286 participants in Thailand by Di-Marketing showed well-known brands of Foremost, Thai-Danish, and Meiji in order of their awareness (Di-onlinesurvey, 2015), which is similar to our overall selected frequencies in its ranking shown in Table 4. The Nabong dairy farm was started in 1985, rented by Nabong Farm Co., Ltd (NAFCO), the Lao-Swedish joint venture company in 1992 and established with a formal contract for 20-year lease between the company and Ministry of Finance (FAO, 2014). Therefore, total 15.92% would be possible considering its business history in Laos.
III. ESTIMATION RESULTS:
CONDITIONAL LOGIT APPROACH

Conditional logit model fits McFadden’s choice model, which is a specific case of the more general conditional logistic regression model (McFadden, 1973). Table 5 shows results of estimating random utility function for milk preferences in Laos using the (alternative-specific) conditional logit model.

Price and fat content affect negatively on Laos consumers’ utility while calorie content increases the utility, and those attributes are all significant at 1% level. The negative effect of the fat content on consumers’ utility would be explained by the fact that there had been 44.8% decrease in sales of whole milk which contains total fat content while 30.0% increase in low-fat milk between 1966 and 1987 in the U.S.A. (Gould et al., 1990). The findings of both calories and fat content indicate that if Lao government wants to promote milk consumption, controlling fat content is more important than calorie content since willingness to pay for an additional fat content is -775.9 kip (1,000 kip * -0.0270/0.0348), which is much higher in the absolute value than 48.9 kip (1,000 kip * 0.0017/0.0348) of willingness to pay for an additional calorie.

When it comes to the personal characteristics, male consumers are less likely to prefer milk products than females on average except the hypothetical brand of Laos-Korea that shows indifference between males and females. It means that policy toward females for milk consumption would be more effective than males.

Regarding age groups, the utility is reduced when consumers are getting old. For instance, the utility for Foremost that is the most prevalent in Laos shows a negative relationship with the consumers of their 20s, 30s, and 40s compared to the 10s. It might be due to various substitutes for keeping their health status when people get old. This result also provides a thoughtful insight on the importance of policy toward young children when the government wants to increase milk consumption for their people’s nutrition.
Table 5. Random Utility Estimation Using Conditional Logit Model

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Foremost</th>
<th>Nabong</th>
<th>Thai-Danish</th>
<th>Lao-Korea</th>
<th>Meiji</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product’s Attributes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price (1,000 kip)</td>
<td>1.8904*** (0.1846)</td>
<td>1.3813*** (0.1989)</td>
<td>1.3411*** (0.1895)</td>
<td>0.8822*** (0.2093)</td>
<td>0.9848*** (0.1984)</td>
</tr>
<tr>
<td>Calories</td>
<td>0.0017*** (0.0004)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td>-0.0270*** (0.0022)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respondent’s Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.8904*** (0.1846)</td>
<td>1.3813*** (0.1989)</td>
<td>1.3411*** (0.1895)</td>
<td>0.8822*** (0.2093)</td>
<td>0.9848*** (0.1984)</td>
</tr>
<tr>
<td>Gender(Male dummy)</td>
<td>-0.2023*** (0.0868)</td>
<td>-0.2197*** (0.0929)</td>
<td>-0.2582*** (0.0896)</td>
<td>-0.0012 (0.0989)</td>
<td>-0.2487*** (0.0936)</td>
</tr>
<tr>
<td>20th</td>
<td>-0.4023*** (0.1347)</td>
<td>-0.1797</td>
<td>-0.3457** (0.1392)</td>
<td>-0.0138 (0.1564)</td>
<td>-0.0641 (0.1458)</td>
</tr>
<tr>
<td>30th</td>
<td>-0.3032* (0.1621)</td>
<td>-0.1059</td>
<td>-0.2102 (0.1669)</td>
<td>-0.0292 (0.1873)</td>
<td>-0.3299* (0.1764)</td>
</tr>
<tr>
<td>40th</td>
<td>-0.5017*** (0.1828)</td>
<td>-0.2940</td>
<td>-0.3207* (0.1873)</td>
<td>-0.3700 (0.2169)</td>
<td>-0.6748*** (0.2027)</td>
</tr>
<tr>
<td>50th</td>
<td>0.2514 (0.2593)</td>
<td>-0.0011</td>
<td>0.3960 (0.2638)</td>
<td>-0.0525 (0.3096)</td>
<td>-0.2210 (0.2889)</td>
</tr>
<tr>
<td>60th</td>
<td>0.6835 (0.4883)</td>
<td>0.1526</td>
<td>-0.8337 (0.5229)</td>
<td>-2.0820* (1.1077)</td>
<td>-1.0531** (0.6505)</td>
</tr>
<tr>
<td>Kid</td>
<td>0.4657*** (0.0846)</td>
<td>0.1856** (0.0905)</td>
<td>0.4253*** (0.0872)</td>
<td>0.3175** (0.0974)</td>
<td>0.3802*** (0.0911)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0062 (0.1067)</td>
<td>0.0598</td>
<td>0.1015 (0.1149)</td>
<td>-0.0957 (0.1103)</td>
<td>0.0957 (0.1165)</td>
</tr>
<tr>
<td>Income</td>
<td>-0.0202 (0.0258)</td>
<td>-0.0046</td>
<td>0.04547* (0.0280)</td>
<td>0.0169 (0.0264)</td>
<td>0.0720*** (0.0277)</td>
</tr>
<tr>
<td>Number of purchases per week</td>
<td>-0.2120*** (0.0316)</td>
<td>-0.1094*** (0.0338)</td>
<td>-0.1230*** (0.0323)</td>
<td>-0.1000*** (0.0367)</td>
<td>-0.0704*** (0.0338)</td>
</tr>
<tr>
<td>Pakse</td>
<td>-0.0204 (0.1070)</td>
<td>-0.0187</td>
<td>-0.04273</td>
<td>-0.0017</td>
<td>0.0832</td>
</tr>
<tr>
<td>Luangprabang</td>
<td>0.0813 (0.1023)</td>
<td>-0.6687*** (0.1121)</td>
<td>0.08534</td>
<td>-0.6961*** (0.1051)</td>
<td>-0.2097** (0.1220)</td>
</tr>
<tr>
<td>Observation</td>
<td>68,700</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-18884.334</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald Chi2 (63)</td>
<td>732.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob &gt; Chi2</td>
<td>0.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard errors are in parentheses(*** p<0.01, ** p<0.05, * p<0.1).
The level of education does not affect consumers’ utility for fluid milk. However, consumers living with the children under the age of 12 tend to have a positive relationship with their utility compared to those without children. It indicates that parents recognize the importance of milk consumption for their kids and policy toward family with children would be more effective than those without kids. Consumers are less likely to enjoy their utility for fluid milk if they purchase it more per week, which indicates that Laos consumers are not satisfied with their current milk consumption. It might be the fact that the most common milk in Laos is sterilized one that is known as less tasty than the fresh milk.

Consumers with higher income tend to prefer Meiji and Thai-Danish rather than Foremost and Nabong. Fluid milk of Meiji and Thai-Danish are usually imported from Thailand. However, those have their national brand of Japan and Denmark, respectively and can be regarded as high-quality products. Laos consumers with high income do not prefer their national brand of Nabong, which means that having a national brand of the developed country might be a good starting point if Lao government promotes its national milk industry.

Compared to the consumers in Vientiane, those in Luang Prabang are less likely to have their utility for the brand of Nabong, Lao-Korea, and Meiji. In other words, consumers in Vientiane capital are more likely to buy milk products of Nabong, Lao-Korea and Meiji compared to the Luang Prabang. Thus, policy towards boosting milk business focusing on Vientiane capital can be more effective than other cities.

Regarding brand power, Foremost shows the highest level of preferences followed by Nabong, Thai-Danish, Meiji and Lao-Korea based on the estimates of constant for each alternative. That is, consumers are more likely to buy real milk products especially Foremost that is the most familiar brand in Laos. Consumers also show a strong preference for their national brand, Nabong on average even though it is not available in the current market, which means that Laos consumers have a tendency toward their national brand and Lao government has an advantage of having national milk company. This result can provide valuable insights on its national plan of the 8th NSEDP (2016~2020) for developing livestock industry in Laos.

Table 6 indicates marginal effects of both products’ attributes and consumers’ characteristics, which derived from the conditional logit model estimated from Table 5. Marginal effects can be calculated by making derivative of the probability
of each brand with respect to each attribute (Greene, 2003: 723). When the price increases by 1 unit (1,000 kip), odds of choosing a specific brand are expected to decrease by 0.74% for the brand of Foremost, 0.50% for Nabong, 0.58% for Thai-Danish, 0.32% for Lao-Korea and 0.44% for Meiji. Foremost is highly sensitive to the price changes while the hypothetical brand, Lao-Korea, is at the low level. When the butterfat increases by 1 unit (g), the probability decreases by 0.57% for Foremost, 0.38% for Nabong, 0.45% for Thai-Danish, 0.25% for Lao-Korea and 0.34% for the brand of Meiji. It seems that Laos consumers are more sensitive to fat content for Foremost and Thai-Danish than others. On the other hand, when the calorie increases by 1 unit (kcal), the probability increases by 0.04% for Foremost, 0.02% for Nabong, 0.03% for Thai-Danish, 0.02% for Lao-Korea and 0.02% for the brand of Meiji. It seems to be a quite similar across milk brands.

Table 6. Marginal Effects for Products’ Attributes and Consumer’s Characteristics

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Foremost</th>
<th>Nabong</th>
<th>Thai-Danish</th>
<th>Lao-Korea</th>
<th>Meiji</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>-0.0074*** (0.0016)</td>
<td>-0.0050*** (0.0011)</td>
<td>-0.0058*** (0.0013)</td>
<td>-0.0032*** (0.0008)</td>
<td>-0.0044*** (0.0010)</td>
</tr>
<tr>
<td>Calories</td>
<td>0.0004*** (0.0001)</td>
<td>0.0002*** (0.0001)</td>
<td>0.0003*** (0.0001)</td>
<td>0.0002*** (0.0000)</td>
<td>0.0002*** (0.0001)</td>
</tr>
<tr>
<td>Fat</td>
<td>-0.0057*** (0.0005)</td>
<td>-0.0038*** (0.0004)</td>
<td>-0.0045*** (0.0004)</td>
<td>-0.0025*** (0.0003)</td>
<td>-0.0034*** (0.0003)</td>
</tr>
<tr>
<td>Gender (male dummy)</td>
<td>-0.0026 (0.0096)</td>
<td>-0.0045 (0.0079)</td>
<td>-0.0138*** (0.0083)</td>
<td>0.0200*** (0.0061)</td>
<td>-0.0082 (0.0071)</td>
</tr>
<tr>
<td>Kid</td>
<td>0.0334*** (0.0093)</td>
<td>-0.0300*** (0.0078)</td>
<td>0.0145* (0.0080)</td>
<td>-0.0041 (0.0060)</td>
<td>0.0034 (0.0069)</td>
</tr>
<tr>
<td>Education</td>
<td>-0.0128 (0.0115)</td>
<td>0.0043 (0.0098)</td>
<td>0.0142 (0.0102)</td>
<td>-0.0130* (0.0074)</td>
<td>0.0091 (0.0090)</td>
</tr>
<tr>
<td>Income</td>
<td>-0.0023 (0.0027)</td>
<td>-0.0056** (0.0023)</td>
<td>0.0038 (0.0024)</td>
<td>-0.0011 (0.0018)</td>
<td>0.0066*** (0.0021)</td>
</tr>
<tr>
<td>Number of purchases per week</td>
<td>-0.0247*** (0.0037)</td>
<td>0.0040 (0.0031)</td>
<td>0.0019 (0.0031)</td>
<td>0.0033 (0.0024)</td>
<td>0.0092 (0.0027)</td>
</tr>
<tr>
<td>Probabilities at the mean level</td>
<td>0.3090</td>
<td>0.1748</td>
<td>0.2148</td>
<td>0.1039</td>
<td>0.1500</td>
</tr>
</tbody>
</table>

Standard errors are in parentheses (* p<0.01, ** p<0.05, * p<0.1).
For individual characteristics, the probability of choosing each brand for males decreases by 1.38% for Thai-Danish and 2.0% for Lao-Korea over females. For those living with children under 12, the probability of selecting fluid milk increases by 3.34% for Foremost and 1.45% for Thai-Danish over those living without children while the likelihood of choosing Nabong reduces by 3.0%. In other words, parents with kids are more likely to buy Foremost and Thai-Danish and less likely to buy Nabong compared to the households without kids.

When the level of income increases by 1 unit (500,000 kip), the probability of choosing fluid milk decreases by 0.56% for Nabong while that of selecting Meiji increases by 0.66%. If consumers often purchase Foremost previously, the probability of repurchasing it decreases by 2.47%, and it depends on consumers’ previous behavior, which means that Foremost did not have strong brand power even though it is quite popular in Laos.

Overall probabilities for selecting each brand at the average level of all explanatory variables are 30.9% for Foremost, 17.48% for Nabong, 21.48% for Thai-Danish, 10.39% for Lao-Korea, and 15.0% for Meiji. It demonstrates that the most popular fluid milk in Laos is Foremost, followed by Thai-Danish, Nabong, Meiji, and Lao-Korea, which is similar to frequencies for each brand shown in Table 4.

IV. CONCLUSION

This study has its uniqueness in a sense that it provides parts of fluid milk information and consumers’ awareness of their dairy products in Laos, which has never done before in academic research. Based on the results, the price, the brand, the amount of calorie and butterfat content are the most important factors when consumers decide to purchase fluid milk in Laos. Based on the survey conducted in 2015, the price affects negatively to consumers’ utility, which is reasonable and intuitive compared to previous research done in China and Turkey. The amount of fat reduces consumers’ utility on average, which means that consumers prefer low fat to high fat from fluid milk. Increasing the amount of calorie can provide more utility for consumers as it is a source of energy. Since willingness to accept for an additional fat content is much higher than a willingness to pay for an extra calorie in the absolute value, focusing on fat content is more important than calorie if Lao government wants to promote fluid milk consumption for enhancing people’s nutrition.
When it comes to brand power, consumers prefer existing brands to a hypothetical one in the order of Foremost, Nabong, Thai-Danish, Meiji, and Lao-Korea. The probability of buying the hypothetical product of Lao-Korea is 10.39% at the mean level of other explanatory variables, which indicates that there exists a potential brand power due to the impact of Korean wave in Laos.

Laos national brand, Nabong still has a market power with the probability of 17.48% on average compared to others although it is not available in the current market. Therefore, the effect of policy toward promoting livestock and dairy industry promulgated in the 8th NSEDP (2016~2020) would be accelerated if the government project for enhancing that industry is linked to their previous national brand. Moreover, since consumers prefer only Meiji when their income increases based on its marginal effect, it is better to look into its quality and market strategy of that brand when Lao government establishes their national brand again in the market.

Individual characteristics such as income, the gender, whether or not respondents to live with children, the frequency for purchasing fluid milk per week, age, and location are also significant factors for consumers’ preference. Females tend to increase their utility when they buy fluid milk compared to males. People living with children are more likely to buy fluid milk compared to those without children. Consumers are less likely to enjoy fluid milk if they often purchase it on average. Consumers’ utility decreases when they become old due to the high possibility of having other various sources for their nutrition. Consumers living in Vientiane capital would be more likely to buy fluid milk of Nabong, Lao-Korea and Meiji compared to the Luang Prabang. Therefore, the policies to promote milk industry by implementing its national brand would be more effective if it focuses on the young generation, female consumers, families having children, quality of dairy products, and Vientiane capital areas.

REFERENCES


First version received on 24 May 2017
Peer-reviewed version received on 14 June 2017
Final version accepted on 10 July 2017
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   I. Introduction
      1. The Model
      1) Research
      2. The Empirical Results
   II. Implications
      1. The Model

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   1) References must be in alphabetical order (name of people and organizations) using Chicago Manual of style. Foreign reference written in foreign language must be translated in English and follow the same rule.
   2) References with the same author must be displayed as well.
   3) For example,
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         Surname, X. and Y. Surname. Year. Title with Initial Caps. Place: Publisher.
      ② ARTICLE IN A BOOK
      ③ JOURNALS
      ④ PAPER
      ⑤ WEBSITE
Regulation on 「East Asian Economic Review」 Publication

Enacted on December 20, 2002
Revised completely on December 9, 2008
Amended on March 29, 2011
Amended on December 23, 2014
Amended on June 1, 2016

Chapter 1 General Provisions

Article 1 (Purpose)
The purpose of this Regulation is to prescribe general issues for the publication of the East Asian Economic Review (hereinafter, “EAER”), a quarterly academic journal. (Amended on March 29, 2011; December 23, 2014; June 1, 2016)

Article 2 (Aim of Publication)
The EAER aims to provide theoretical background and policy research for the Korean government pertinent to the development of international economic policy.

Article 3 (Period of Publication)
The Journal shall be published four times each year on the last day of March, October, October and December.

Article 4 (Paper Submission and Peer Review)
Submitted papers shall comply with provisions on Paper Submission included in Chapter 4 of this regulation, and their publication in the Journal is determined by the EAER Editorial Board pursuant to “Chapter 3: Review” of this regulation.

Article 5 (Distribution)
The EAER shall be distributed in accordance with the Publication Distribution Standards of the Korea Institute for International Economic Policy (KIEP). (Amended on December 23, 2014)
Chapter 2 Editorial Board

Article 6 (Purpose of the Editorial Board)
This Chapter stipulates general issues related to the organization and operation of the EAER Editorial Board (“the Board” hereafter). (Amended on December 23, 2014)

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(1) The Board, on the assumption that it agrees to the Code of Ethics for EAER, shall examine and determine all issues related to the editing and publication of the EAER.
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(2) If the members including the Editor-in-Chief are unable to fulfill their duties faithfully or cannot perform their tasks owing to circumstances beyond their control, they may be discharged from the Board during their term.

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(1) The Editor-in-Chief shall take charge of all matters related to the editing of the Journal and ask for advice and help from the management for publication.
(2) The Editor-in-Chief shall produce a report on editing and accounting for the EAER to the KIEP management.

Article 10 (Operation of the Editorial Board)
(1) The term of office of the Board members including Editor-in-Chief and Managing Editor is two years. Board members may serve consecutive terms for the purpose of maintaining the continuity of the Board’s operation, and the change in the number of members each year shall not exceed half of the total number of members.
(2) External board members shall be paid an honorarium for participating in Editorial Meetings and Consultancy.

Article 11 (Convocation and Resolution of Editorial Meetings)
(1) Editorial Meetings shall be convened at least twice a year, and ad hoc meetings shall be convened as the Editor-in-Chief deems necessary. (Amended on March 29, 2011)
(2) The resolutions of the Editorial Meetings shall be adopted by the attendance of the majority of the Board members and by the concurrence of the majority of those present.
Article 12 (Advisory Board)
(1) In order to execute the purpose of the publication of EAER and to improve the Institute’s theoretical and policy analysis contribution to the government, the Editor-in-Chief may appoint advisory board members.
(2) An editorial board member who previously held the post of Editor-in-Chief shall be appointed as an ex-officio advisory board member.

Chapter 3 Review

Article 13 (Purpose of the Review)
This chapter is to provide regulations on the review process of papers submitted for EAER publication.

Article 14 (Progression of Review)
(1) Prior to the first peer review, a “suitability evaluation” shall be conducted in order to decide whether a submitted paper conforms to the EAER’s aims and scope. Suitability evaluation shall be carried out by an editorial member with expertise in the submitted paper’s field of interest. (Amended on December 23, 2014)
(2) Appointment of a reviewer shall be based on discussions among the Board members with expertise in the relevant research field, and a review panel shall be composed of three or more reviewers within or outside KIEP. (Amended on December 23, 2014)
(3) If a reviewer candidate responds negatively to the request for review, Editor-in-Chief shall select another candidate through discussions with Board members with expertise in the field of interest.
(4) The conduct of review shall be reflected in the performance evaluation for the reviewer within the Institute and rewarded by an honorarium for an external reviewer.

Article 15 (Considerations for Review)
A reviewer evaluates submitted papers on the basis of following considerations:
(1) significance of research;
(2) excellence of research (i.e. originality, distinctiveness, logic, cogency, and so on);
(3) adequacy and excellence of research methodology;
(4) utility of research results and their implications;
(5) veracity of source quotations and references;
(6) general issues to improve (expression, typos, quotation, table of context, title, etc.);
(7) the EAER’s aims to contribute to the establishment of Korea’s international economic policies.
Article 16 (Procedure)
(1) Manuscript to review shall be made anonymous before it is forwarded to reviewers.
(2) The review procedure consists of two separate rounds: The first review is conducted in accordance with a EAER review form; and the second review examines the revised manuscript reflecting the comments from the first review.
(3) Reviewers shall rate submitted papers into four categories: “Accept: No revisions needed”; “Accept: Minor revisions needed”; “Major revisions needed: Second review after revision”; and “Reject.” They use a given EAER review form to prepare a referee report containing their comments on a manuscript’s research contents, its style, and recommendations for revision and submit the filled out form to the Board. (Amended on December 23, 2014)
(4) If reviewers decide that a manuscript needs to be revised, the grounds for revision shall be specified on referee reports. (Amended on December 23, 2014)
(5) Authors shall submit their revision reports in response to each referee comment with a revised manuscript. (Amended on December 23, 2014)

Article 17 (Second Review)
(1) The Board shall forward referee reports from the first round of the review to the authors. And authors shall submit their revision reports in response to each referee comment with a revised manuscript to the Board within a set period of time.
(2) If an author does not submit a revised manuscript and revision reports within the given time without any specified explanation, it shall be considered a withdrawal of the paper submitted.
(3) If the receipt of the results of the second review are delayed for over 30 days after the review request to a reviewer, the Board may make the final decision on paper publication based on the reviewer’s first referee report as well as the author’s revision report and his/her revised manuscript. In this case, the final decision by the Board will be notified to the requested reviewer.
(4) The second review shall be held once, and if review results from the second round are not decisive enough to conclude discussions on the paper’s publication, the Board shall be requested to undertake a final review.

Article 18 (Change of Referees)
If authors object to the review results, the Editor-in-Chief may request a third reviewer to examine the paper, provided that authors submit a written statement of their grounds for the objection which must be accepted as reasonable by the Editor-in-Chief.

Article 19 (Treatment of Review Results)
(1) A referee report with review results shall not include any of the reviewer’s personal information when being sent to the authors.
(2) If a reviewer rates a paper as “Minor revisions needed”, authors shall be requested to submit a revised manuscript with revision reports, which will be sent to the reviewer to be examined. After the examination, the reviewer is supposed to present her/his written agreement or disagreement on the revised paper’s publication and their grounds for agreement or disagreement using a given form.
(3) If a reviewer rates a paper as “Major revisions needed: Second review after revision”, authors shall be requested to submit a revised manuscript with revision reports, which will be sent to the reviewer for the second review. After the second review, the reviewer is supposed to present her/his written agreement or disagreement on the revised paper’s publication and their reasons for agreement/disagreement using the form given.

Article 20 (Completion of Review)
(1) The Board shall make a final decision on a paper for publication on the EAER on the basis of review results from reviewers and the editorial board member concerned.
(2) If it is not possible to publish a final paper on the latest EAER issue due to reasons related to the editing process, the paper may be published on the following issue. (Amended on December 23, 2014)

Article 21 (Notification of Publication)
When the Board reaches a decision to publish a paper on the upcoming issue of EAER, it shall be notified to the authors concerned within 7 days from the date of final decision.

Article 22 (Certificate of Expectant Publication)
For papers cleared for publication on the EAER, a certificate of expectant publication could be issued at the request of the author.

Chapter 4 Paper Submission

Article 23 (Authorship and Required Documents, Scope of Journal)
(1) There are no restrictions regarding qualifications of contributors. And the scope of research shall cover a wide range of themes related to international economics or external economic circumstances for Korea, and manuscripts should be written in English. (Amended on December 23, 2014)
(2) The submitted paper should be an original work which has not been published in other publications.
(3) Authors shall fill out and submit the forms for “Paper Submission” and “Copyright Assignment Agreement” along with the manuscript. In signing the form, it is assumed that authors have agreed to the submission and that the manuscript is not currently being considered for publication by any other journal.
Article 24 (Word Limit)
Manuscripts should be written in English and should be no longer than 10,000 words based on MS-word processor. (Amended on December 23, 2014)

Article 25 (Description of Authors)
Manuscripts with more than one author should display the authors’ names in order of their contribution.

Article 26 (Manuscript Submission)
Manuscripts can be submitted throughout the whole year. Manuscripts submitted by the last days of January, April, October, and October shall be considered candidate papers for issues published in March, October, October and December, respectively. (Amended on March 29, 2011)

Article 27 (Honorarium)
For the authors of manuscripts cleared for publication by the Board through the review procedure, an honorarium shall be given.

Article 28 (Award for Paper of Excellence)
(1) For papers, among the published articles during a given one year period, recognized for their exceptional excellence, financial reward will be granted. (Amended on December 23, 2014)
(2) For the selection of the paper for excellence, a separate review panel shall be established.

Article 29 (Submission Method)
(1) Manuscripts shall be submitted by email (eaer@kiep.go.kr).
(2) Manuscripts should comply with the “Guidelines for Manuscript Preparation” designated by this Regulation.
(3) Authors’ contact information such as phone numbers, addresses, email addresses, and so on should be stated clearly, and submitted manuscripts are not returnable.
(4) Manuscripts are to be submitted to the EAER Editorial Board at KIEP. (Amended on March 29, 2011, and on December 23, 2014)

Article 30 (Guidelines for Manuscript Preparation)
Manuscripts should be prepared in accordance with the Guidelines for Manuscript Preparation provided by KIEP. (Amended on March 29, 2011, and on December 23, 2014)
Article 31 (Supplementary Provision)
For other matters not provided by this Regulation, the Board’s decisions on related matters shall apply. (Amended on December 23, 2014)

Addendum (December 9, 2008; March 29, 2011; and December 23, 2014)

Article 1
This regulation shall enter into force on the date of its approval by the President of the Korea Institute for International Economic Policy.
Code of Ethics for East Asian Economic review

Enacted on December 9, 2008
Completely revised on June 1, 2016

Chapter 1 General Provisions

Article 1 (Purpose)
The purpose of this Code of Ethics (hereinafter, “the Code”) is to provide ethical standards with respect to the publication of the East Asian Economic Review ("EAER"), a quarterly of the Korea Institute for International Economic Policy (“KIEP”).

Article 2 (Scope of Application)
The Code applies to all actions related to paper submission to the EAER, in addition to editing and review of papers submitted.

Article 3 (Enforcement of Ethics)
(1) Authors, reviewers, and editorial board members are to agree to abide by the Code. (2) As the Code enters into force, it is automatically assumed that the Authors, reviewers, and editorial board members have agreed to Article (1).

Chapter 2 Definitions

Article 4 (Purpose)
This Chapter stipulates definitions and ethical issues pertaining to EAER publication. Cases of and contrary to ethical conduct can happen at any stage of publication; the definitions for each case are as follows:

1. “Research ethics” refers to ethical issues in the conduct of research and, by extension, in the regulation of research, the procedures and process of ethical review as well as broader ethical issues related to research such as scientific integrity and the end uses of research.
2. “Publication ethics” refers to ethical issues in reviewing research, in reporting research results.
③ “Fabrication” refers to the recording or reporting of spurious, false data or research results;
④ “Falsification” refers to the manipulation of the research process or the arbitrary alteration or omission of data which lead to the distortion of the contents or the results of the research.
⑤ “Plagiarism” refers to the unauthorized use of others’ idea, logic, specific terms, data, and analysis as one’s own original work, either intentionally or unintentionally, without any indication of the sources.
⑥ “duplicate or redundant publication” refers to the practice of authors’ use of their previously published works in whole or in part without proper citation as though they were new, or in a manner that goes beyond the conventionally accepted level.
⑦ “Authorship” refers to recognizing those who made substantial contributions to the research and to publications, and took formal responsibility for submitted and published work as authors.
⑧ “Conflict of Interest” refers to those factors that might influence the conception, conduct, analysis, and reporting of the research. These might include relevant financial interests, academic competitiveness or personal, political, or religious interests.
⑨ “Withdrawal” refers to authors’ voluntary cancellation of their submission when they discover an error(or errors) in submitted manuscripts before its publication.
⑩ “Retraction” refers to a mechanism for correcting the literature and alerting readers to publications that contain such seriously flawed or erroneous data or to cases of research misconduct.

Chapter 3 Writing, Editing, and Peer-review

Part 1 For Authors

Article 5 (Originality)
① The manuscript being submitted should be written in accordance with the Guidelines for Manuscript Preparation provided by the EAER Editorial Board and should comply with all relevant regulations.
② The manuscript being submitted should have been prepared in an ethical and responsible manner without fabrication, falsification or inappropriate data manipulation, etc.
③ Author(s) should adhere to publication requirements that demand submitted manuscripts be original and has not been published elsewhere in any language.

Article 6 (Authorship)
① Authorship should be given to those who made substantial contributions to the
research and to publications and Author(s) should take collective responsibility for submitted and published work.

② Author(s) should ensure that only those who meet Authorship criteria are rewarded with Authorship and there are no guest, gift, and ghost Authorship.

③ The Authorship of submitted work should accurately reflect individuals’ contributions to the work and all authors should be able to identify which co-authors are responsible for specific parts of the work.

Article 7 (Conflict of Interest)
① Author(s) should disclose funding sources and relevant conflicts of interest, if any. It should include both financial and non-financial interests and relationships such as direct and indirect financial support, supply of equipment or materials, and other support.

② Funders and sponsors should not be able to veto publication of research that do not favor their position. Author(s) should not enter into agreements that permit sponsors to veto or control the publication of the research.

Article 8 (Revision)
① Author(s) should revise their manuscripts in accordance with the publication regulations of the EAER Editorial Board and submit a revision report reflective of reviewers’ opinions.

② Author(s) should alert the editorial board promptly if they discover an error in any submitted, accepted or published work. Author(s) should cooperate with the editorial board in issuing corrections or retractions when required.

Article 9 (respect for the Editorial Board)
Author(s) shall respect the opinions of reviewers and the decisions made by the Editorial Board.

Part 2 For the Editorial Board

Article 10 (Duty and Responsibility)
① The Editorial Board should take responsibility for everything they publish, and the most important part of the responsibility to make fair and unbiased decisions for publication shall be the upholding of principles of editorial independence and integrity.

② The Editorial Board should have policies and procedures in place to ensure the quality of the material they publish, to maintain the integrity of the published record and to prevent and investigate misconduct related to research and publication.
Article 11 (Conflict of Interest)
① The Editorial Board (members) shall provide fair treatment in reviewing submitted manuscripts, on the basis of their quality and the EAER publication regulations only, without regard to prejudice against or personal connection to the author(s).
② The Editorial Board (members) should not be involved in decisions about papers in which they have a conflict of interest, such as the same affiliations, a personal or financial relationship with the author(s).

Article 12 (Fair Request for Peer-review)
① The Editorial Board should select and make a request for peer review to a candidate with expertise in the field of interest and capacity for fair judgment.
② The Editorial Board should avoid selecting reviewers with conflicts of interest. The Editorial Board should ask peer reviewers to inform them about any such conflict of interest at the earliest opportunity.
③ If there is a sharp contrast among the peer review results of different reviewers, the Editorial Board may make an additional request for a review to a third expert in the related field.

Article 13 (Confidentiality)
① The Editorial Board should protect the confidentiality of authors’ identities in the material before it is published and should not give any indication of a paper’s status with the journal to anyone other than the author(s).
② The Editorial Board should not share the authors’ identities with reviewers and also should not disclose their names when making a request or sending out manuscripts for peer-review.
③ The Editorial Board should protect the reviewers’ identities and should not disclose their names when sending reviewers’ report to author(s).

Article 14 (Respect for Authors)
The Editorial Board shall respect the personality and independence of authors as an intellectual with expertise and should not pressure authors to add citations from the EAER for the implied purpose of increasing citation rates and, by extension, journal impact factor.

Part 3 For Reviewers

Article 15 (Peer-review in Good Faith)
Reviewers should review a manuscript commissioned by the Editorial Board in good faith and submit the review results to the Board within the proposed time-frame,
informing the journal promptly if they require an extension. If reviewers consider themselves not qualified enough to review the manuscript, they are to notify the Board immediately.

**Article 16 (Conflict of Interest)**

① Reviewers should declare any potentially conflicting or competing interests (which may, for example, be personal, financial, intellectual, professional, political or religious), and should decline to review if they feel unable to provide a fair and unbiased review.

② Reviewers should not intentionally prolong the peer-review process for competitive advantage, either by delaying the submission of their review or by requesting unnecessary additional information from the journal or author.

**Article 17 (Fair Review)**

① Reviewers should be objective and constructive in their reviews and provide a fair review report on a manuscript regardless of their personal academic views. They should also provide adequate grounds for the review results through meticulous examination.

② Reviewers should provide feedback that will help the authors to improve their manuscript and provide evidence with appropriate references to substantiate general statements, and should be specific in their criticisms.

**Article 18 (Respect for Authors)**

Reviewers should respect the personality and independence of authors as an intellectual with expertise. Reviewers shall present their opinions on paper and explain proper grounds for revision if necessary.

**Article 19 (Confidentiality)**

① Reviewers should be required to maintain confidentiality with respect to papers for peer review. Unless seeking advice critical to conducting a fair review with approval of the Editorial Board, they should not allow others to have access to the paper concerned. And they should not release the paper to the public before its publication by the EAER.

② Reviewers should not involve anyone else in the review of a manuscript and should keep all manuscript and review details confidential, without any inappropriate use of confidential material.

**Chapter 4 Ethics Committee**

**Article 20 (Reporting Violations)**

① If there is any violation of this Code with respect to publication of the EAER, anyone may inform the EAER Editorial Board about such violations.
② The Editor-in-Chief should not reveal any personal information of persons reporting violations and take necessary measures to protect the confidentiality of the informant. Along with the Editor-in-Chief, the Korea Institute for International Economic Policy (KIEP), the publisher of the EAER, should protect the informant from negative consequences or possible external pressures.

Article 21 (Composition and Resolution of the Ethics Committee)
① In response to reports of violations of the Code under Article 20(1), the Editor-in-Chief should form an independent Ethics Committee which consists of five or more members with expertise as recommended by the Editorial Board.
② President of the Ethics Committee shall be appointed by the Editor-in-Chief.
③ The resolution of the Ethics Committee shall require the consent of 2/3 of all registered members.

Article 22 (Duties and Authority of the Ethics Committee)
① The Ethics Committee is obligated to investigate the stated violations of the Code, while the party subject to the investigation must prove his or her compliance with the Code.
② The Ethics Committee may request the person(s) reporting violations to submit necessary documents to verify the violations and demand that the suspected party submit pertinent statements or materials for explanation.
③ The Ethics Committee should conclude its investigation and concomitant deliberations within 60 days of the date of its establishment.
④ The Ethics Committee should take down the minutes of the committee. Minutes shall be kept of all meetings and circulated to the members of the Committee, and be reported to the Editor-in-Chief when needed during investigation.
⑤ The Ethics Committee should submit a report to the Editor-in-Chief within 10 days after the conclusion of the investigation and deliberations on the violation under Article 22(3) above. If it is determined that there is an actual violation of the Code, the Committee should recommend proper disciplinary measures.

Article 23 (Guarantee of Vindication)
The Ethics Committee should provide the suspected person or party sufficient opportunity to explain herself/himself.

Article 24 (Freedom from Suspicion)
If the Ethics Committee determines that a person suspected of violation of the Code is cleared of suspicion, it is the responsibility of the Ethics Committee to prepare active and subsequent remedial measures for the suspected person’s reputation, and to recommend
them to the Editor-in-Chief. The Editor-in-Chief should accept and implement the recommended measures immediately.

Article 25 (Confidentiality)
The members of the Ethics Committee and any person who participates in the investigation or deliberations for violations of the Code shall be obliged not to divulge any confidential or personal information that they have acquired during the work of the Committee.

Chapter 5 Disciplinary Measures against Code Violation

Article 26 (Disciplinary Measures)
If it is determined by Ethics Committee that there is an actual violation of the Code, disciplinary measures by levels of violations should be taken as follows:

① Issuance of an expression of concern or Issuance of a correction
② Notification on the Code violation case to the author’s institution and sponsor
③ Announcement on the Code violation case on the EAER and KIEP webpage
④ Formal removal of the infringing manuscript
⑤ Prohibition against all of the authors for any new submissions to EAER, either individually or in combination with other authors of the infringing manuscript, as well as in combination with any other authors
⑥ Notification on the Code violation case in any relevant indexing and bibliographic databases

Chapter 6 Complementary Provision

Article 27 (Revision)
① This Code shall be revised by the resolution of the EAER Editorial Board
② In the event of the Code revision, a Board member who previously agreed to the existing Code of Ethics is considered to have agreed to the amendments of the Code.

Addenda (Amended on December 2014)

Article 1
This Code shall enter into force on the date of its promulgation.

ⓒ Korea Institute for International Economic Policy
References


AIMS and SCOPE

The East Asian Economic Review is an economic journal, for the promotion of interdisciplinary research on international economics. Published as a quarterly by the Korea Institute for International Economic Policy, a Korean government-funded economic think-tank, the journal is global in perspective and covers both theory and empirical research. The Journal aims to facilitate greater understanding of all issues pertinent to diverse economies of East Asia through publication of rigorous analyses by renowned experts in the field. The EAER connects policy and theory, providing empirical analyses and practical policy suggestions for the economies in the region.

TOPICS COVERED

The East Asian Economic Review brings together articles from many different realms of economics at both regional and global levels. Issues relevant to East Asia's diverse economy are the major focuses. Specific areas of interest include, but are not limited to:
- Trade and Investment Issues
- Economic Integration
- APEC
- ASEAN
- ASEM
- International Finance
- Liberalization of Financial Services and Capital
- International Cooperation for Korean Unification

NOTE FOR AUTHORS

SUBMISSION GUIDELINE:
Refer to our website www.eaerweb.org and Click “Submission” menu at the top of the main page.

SUBMISSION DEADLINE:
The Journal is published every March, June, September and December of each year and submissions are accepted for review on an ongoing basis (No specific deadline).

REVIEW PROCESS:
We have introduced a “fast-track” system, which takes four to five weeks on average from submission to the first round review in order to provide quick and authoritative decisions to the authors. In general, the Journal’s manuscript decision process includes submission, editorial decision on whether the paper should be reviewed, peer review, decisions after review, revision, acceptance in principle, final submission and acceptance, proofs, advance online publication, and print publication.

For further information regarding submission, Contact EAER Editorial Office:
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AWARD FOR EAER

The East Asian Economic Review Award is given annually to articles that have made exemplary contributions to advance the public as well as academic understanding of international economics. Every article published in the Journal is given an honorarium of KRW 2,500,000; and annual nominations for the outstanding and noteworthy articles include KRW 5,000,000 prize and a detailed nomination statement describing how the selected papers have contributed to the knowledge of international economics.