Exploratory Study on Selected Philippine Agricultural Commodity Import Statistics vis-à-vis Export Statistics of the Exporting Countries

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ABSTRACT

Using the import data compiled by the Philippines and comparing these with data as reported by the exporting countries, this study aims to determine the disparity of the statistics from the two sources on the quantity and value of selected agricultural commodities for the years 2000 to 2005. The products covered by this study consist of wholly or semi-milled rice, maize (corn), live poultry, domestic fowls, ducks, geese, frozen meat of bovine animals, apples, oranges, onions and shallots, and garlic. The differences in statistics on the bilateral transactions—in terms of FOB values, quantities, and derived unit prices—are examined by using percentage differences, the implicit minimal measurement error (IMME), and the Wilcoxon Matched-Pair Signed-Ranks (Wilcoxon-MPSR) test. Results show that considerable discrepancies between import and export statistics do exist. The discrepancy may reflect both legitimate conceptual differences between Philippine imports and exports statistics of the exporting countries, as well as errors in reporting. The discrepancy is further substantiated by the results of the Wilcoxon-MPSR test, which show that these differences are significant.

INTRODUCTION

The National Statistics Office (NSO) is mandated by law to generate, compile, and publish a wide range of statistics on population, production, and establishments, among others. One of such statistics is foreign trade, which covers the import and export of goods, and basically involves the transactions between residents of the country and the rest of the world. In principle, these transactions should be recorded at the point at which ownership or the legal title to goods passes between the buyer and the seller.

Foreign trade data compiled by NSO relate to the commerce between the Philippines and other countries by sea and air, whether for private use or for commercial trade, gifts or samples. It also includes animals for the zoo, for breeding and other purposes. However, the following cases are excluded in the compiled trade statistics: (1) fish and other marine products landed by Philippine vessels directly from the sea; (2) goods imported and exported by, or on behalf of the diplomatic services and the armed forces; (3) exposed cinematographic

films imported or exported on rental basis; (4) personal effects of passengers on which no duty was paid; (5) issued currency notes and coins; (6) goods in transit to foreign countries; (7) stores (foodstuff for the crew, spare parts for the vehicle's machine, etc.) and fuels purchased abroad by ships and aircrafts of Philippine registry; and (8) goods sent through parcel post.

Foreign trade data is one of the statistics that the NSO is mandated to gather and comprises one of the components in the computation of the balance of payments (BOP) by the Philippine Central Bank or the *Bangko Sentral ng Pilipinas* (BSP). It is also one of the leading economic indicators, and a major component of the Gross Domestic Product (GDP), besides being a critical input in the estimation of National Accounts by the National Statistical Coordination Board (NSCB).

In addition, it is also used by the Tariff Commission in assessing import duties, monitoring the effects of trade policies, as a support to the trade negotiations, and in the trade flow analysis by the Department of Trade and Industry (DTI). Thus, the accuracy of the compiled foreign trade statistics is imperative as these statistics provide critical information to the public and private sectors.

Although the measurement of foreign trade is well defined by international guidelines and well coordinated internationally, there still remain measurement problems and certain deficiencies with regard to international comparability. One of these is the problem of asymmetry where the value of a country's imports rarely matches the corresponding export value of the exporting country.

Using the 2000-2005 foreign trade data, this study determines the disparity in the recording of the quantity and value of selected agricultural commodities, using These agricultural commodities are: wholly or semi-milled rice, maize (corn), live poultry, domestic fowls, ducks, geese, frozen meat of bovine animals, apples (fresh), oranges (fresh/dried), onions and shallots (fresh/chilled), and garlic (fresh/chilled), as reported/recorded by the Philippines (importing country) and the exporting countries (e.g., China, USA, Brazil, etc). These commodities comprise about 0.9 percent of the FOB value and 3.0 percent of the quantity (in gross kilograms) of total Philippine imports for the years in review.

RELATED STUDIES

Trade statistics for bilateral trade are derived from two independent sources: the reported imports of the domestic economy, and the reported exports of a foreign country. The fact that large inconsistencies between these two records exist gives an impression that bilateral trade statistics are unreliable. However, discrepancies in the bilateral trade statistics do not always reflect unreliable reporting by both partners.

Bautista and Tecson (1976) draw up a fairly comprehensive list of possible sources of discrepancy in partner-country trade data namely: (a) transport costs and other charges (e.g., when export data are expressed in FOB, while the corresponding import data are expressed in CIF); (b) exchange rate overvaluation; (c) time lags in recording; (d) differences in commodity coverage and classification; and (e) differences in the method of designating partner-countries as to the provenance and destination. However, for this study, transport costs and other charges are eliminated as a source of discrepancy, since export and import values are both expressed in FOB terms.

As Bautista and Tecson (1976) observe, exchange rate overvaluation may cause disparity in partner-country trade data if the data-collecting institution (e.g., the GATT Secretariat), in converting data in domestic currency into dollar equivalents for international comparability, uses

an exchange rate that may be different from the free market rate used by the developed partner-countries. This is normally the case for countries under exchange control and multiple exchange rate system, thereby causing a divergence between official and the free market rates. In this study, this factor is similarly ruled out to be a major source of discrepancy since the import data are sourced from a copy of the importer's declaration in dollars, which in turn is based on the commercial invoice issued by the exporters at the other end.

Time lags in recording may result in discrepancies in partner-country data because some goods are reported as having been exported by the source country and not having been received yet by the importing country. However, the effect of this factor shows up in the annual import data only if the import level changes over time (Bhagwati 1974). If the import level shows a constant trend, then the discrepancies due to lags in recording would be offset from year to year. Specifically, the imports of this year which are not recorded due to the lag but which are carried over into next year's import statistics will tend to offset each other and the discrepancy will disappear (Bhagwati 1974).

Discrepancy in partner-country data may also be caused by inaccuracies in commodity classification and/or by inadvertent errors in designating partner-countries. This is particularly true in cases where the goods have to pass through some entrepõt countries before reaching their final destination. The imported goods could be declared as coming from the entrepõt country instead of the actual source country.

A reconciliation study made between Canada and South Korea's merchandise trade in 2001 and 2002 reveals that the two major differences in their trade records are due to indirect trade and export under-coverage. Similarly, re-exports and valuation differences are found to play important roles in trade differences (Bohatyretz 2004).

We also cite a related study conducted jointly by the Bureau of Census, Department of Commerce, China's Ministry of Foreign Trade and Economic Cooperation (MOFTEC), and China Customs on the differences between the 1992 and 1993 merchandise trade statistics of the United States and People's Republic of China. The findings on the eastbound trade show that the transshipments of goods via Hong Kong and intermediary countries account for the large difference; while the other factors related to conceptual and definitional differences (e.g., trade via intermediaries, re-exports, etc.) have little net effect (Wolter and Oberg 1999).

The study further points out that the trade statistics of the two countries will likely continue to differ because of two reasons: a) the final destination is frequently unknown at the time of exportation from China, and b) the US import value includes the value added (e.g., simple mark-up or value addition from further processing) in the intermediary. Differences in the methods used to determine the country of origin likewise exacerbate the discrepancy in the trade statistics of both countries.

For the westbound trade, the study finds that shipments via Hong Kong and other intermediaries cause the differences between the Chinese imports and the US exports; although, the amount is not that large as in the eastbound direction. Conceptual differences such as shipping cost can also cause differences between the import and export statistics.

Yeats (1995) uses partner-country statistics for 30 developing countries to estimate actual (concealed) trade data, and to analyze the magnitude of the resulting errors. The results indicate that partner-country data are unreliable even for estimating trade in broad aggregate product groups such as foodstuff, fuels, and manufactured goods. Tests also show that the reliability of partner-country statistics

degenerates sharply as one moves into more finely distinguished trade categories or more disaggregated Standard International Trade Commodity (SITC) levels.

DATA AND METHODOLOGY

This study uses the Philippine import statistics compiled by the National Statistics Office and the export statistics of the exporting countries obtained from *http://comtrade.un.org/db* for the years 2000 to 2005. The agricultural commodities covered are wholly or semi-milled rice, maize (corn), live poultry, domestic fowls, ducks, geese, frozen meat of bovine animals, apples, oranges, onions and shallots, and garlic. The data include only those export statistics that have corresponding Philippine imports.

The analysis uses descriptive statistics, percentage differences, the implicit minimal measurement error (IMME), and the nonparametric Wilcoxon Matched-Pairs Signed-Ranks (Wilcoxon-MPSR) Test.

The implicit minimal measurement error (IMME) measures errors in data that are reported from two sources, and is computed as follows (Van Bergeijk 1995):

$$\text{IMME (\%)} = \left\{ \frac{\text{Destination source} - \text{origin source}}{\text{Destination source} + \text{origin source}} \right\} \text{X } 100$$

The IMME indicator assumes implicitly that both sources are wrong and offers a conservative estimate only on a lower limit for the measurement of error in the data. Although it is very difficult to take an informed position over the accuracy of the data, this can be considered an optimistic indicator of the same as it provides a way of assessing the reliability of bilateral trade flows. In absolute terms, the indicator ranges from 0 to 100 percent and could take both positive and negative values. Thus, the lower the IMME value, the better.

The choice between a parametric and nonparametric test is derived from the two underlying assumptions. Parametric tests assume that the data to be tested are normally distributed and equal-interval (cardinal) in nature. However, in nonparametric tests, the data are not required to be normally distributed and can be assumed at an ordinal-metric level; i.e., the original data can be validly ordered such that the ordering system of the differences between the two sets of data can be preserved. As Lowry (1999) explains, the choice is not simply a question of good taste but of computational soundness too. If one or more assumptions of a statistical test cannot reasonably be satisfied, then the corresponding test for correlated samples cannot be legitimately applied. Hence, a nonparametric test is definitely preferred for the following cases: a) when testing small samples (<30); b) when there are unequal variances across groups; and c) when either the population is clearly not normal or some values are 'off the scale', i.e., there exist too high or too low values (Motulsky 1995).

The Wilcoxon-MPSR tests the null hypothesis that there is no systematic difference within pairs of data against the alternative hypothesis that asserts a systematic difference. Ignoring zero differences, the differences between the values in each pair are ranked without regard to sign, i.e., only the magnitudes are considered. Then the sums of the positive ranks (R+) and of the negative ranks (R-) are calculated. For a two-tailed test, the smaller of the ΣR+ and ΣR- is called *W*. This *W* is the statistic that may be compared with the critical values for the Wilcoxon Signed- Rank test table. For one-tailed tests, *W* will take the value of ΣR+ for Ha: $W>0$ and ΣR- for Ha: $W<0$. A true null hypothesis Ho: $W=0$ means that there is no difference between the two series compared. Hence, one would expect the ΣR+ and ΣR- to be

the same, i.e., there are as many large positive as negative differences and as many small positive and negative differences. For the difference to be significant, the calculated *W* must be less than or equal to the Wilcoxon Signed-Rank test tabulated value. As noted, Wilcoxon-MPSR test statistics has a sampling distribution that is approximately normal when the number of pairs is large, say, *n*>15; close enough to allow for the calculation of a z-ratio, which is referred to as the standardized normal distribution *(http://www.lesn.appstate.edu/olson/stat_directory)*. Friedman (1937) finds that the method of ranks does not utilize all the information furnished by the data, since it relies solely on the order of the observations and makes use of the quantitative magnitude of the variance; in turn, making it independent of the assumption of normality. Nevertheless, it is desirable to obtain some notion about the information lost to infer about the efficiency of the method of ranks. The same paper, however, concludes that the loss of information in using the method of ranks is negligible; hence, the Wilcoxon-MPSR has about 95 percent of the power of the parametric alternative.

For this study, a two-tailed test is used since there is no prior opinion regarding the direction of the mismatch between the imports of the Philippines and the exports of the exporting countries. The only objective for using the Wilcoxon-MPSR test is to determine if the differences in the reported figures are statistically significant, that is, there is no particular interest on the direction of the differences.

PRESENTATION AND ANALYSIS OF RESULTS

Profile of the Data

Results of the Kolmogorov-Smirnov[1] and Shapiro-Wilk[2] normality tests reveal the non-normality of the trade data (Table 1). Given that the null hypothesis favors normality of a given

Table 1. Tests of normality for all variables and commodity groups covered in the study, 2000-2005.

	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistic	**df**	**P-value**	**Statistic**	**Df**	**P-value**
Philippine Imports						
FOB (in US$)	.415**	339	.000	.192**	339	.000
Quantity (GK)	.420**	339	.000	.189**	339	.000
Exports						
FOB (in US$)	.407**	339	.000	.217**	339	.000
Quantity (GK)	.397**	339	.000	.273**	339	.000

[a] Lilliefors Significance Correction
** significant at α=1%

[1] Kolmogorov-Smirnov (Lilliefors) is a modification of the Kolmogorov-Smirnov test that tests for normality when means and variances are not known, but must be estimated from the data. The Kolmogorov-Smirnov test is based on the largest absolute difference between the observed and the expected cumulative distributions

[2] Shapiro-Wilk tests the hypothesis that the sample is from a normal population.

distribution, the significant test statistics for both the Kolmogorov-Smirnov and the Shapiro-Wilk tests support the alternative hypothesis that the distribution of the Philippine imports and counterpart exports of trading partners, both in volume of trade (quantity) and FOB values, is non-normal. Thus, a nonparametric test, particularly the Wilcoxon-MPSR test, is used in determining whether the differences between the data recorded by the Philippines and the exporting countries are significant.

Table 2 shows the number of trading partners that are included in this study. These countries have a corresponding import transaction with the Philippines for the commodities covered in the study. Note that the Philippines has the most number of bilateral transactions in 2000, and the least in 2004, which means that more matched transactions (import vs. export) of the traded commodities are noted in 2000 than in 2004.

By commodity, frozen meat of bovine animals shows the highest number of bilateral transactions (61) followed by corn (59). The commodity with the least number of transactions is garlic (14).

Table 3 presents the mean, standard error of the mean[3], and their corresponding coefficient of variation (CV) by commodity. Except for frozen meat of bovine animals, wholly/semi-milled rice, and maize (corn), the FOB values of the Philippine imports are in general relatively lesser than the reported FOB values of the exports of the exporting countries.

On the other hand, the reverse is true for quantity, i.e., more than half of the exports of the exporting countries show lesser quantity variability than that of the Philippine imports. This is particularly true for rice, corn, frozen meat, apples, and oranges. Interestingly, garlic posts the highest CV for both the FOB values and quantity among the exports of the exporting countries, while rice and garlic do so among the Philippine imports for the FOB values and quantity, respectively. This is due to the presence of very low and very large FOB values and quantities for the said commodities.

Table 2. Number of trading partners covered in the study, by commodity, 2000-2005.

Commodity	Total	2000	2001	2002	2003	2004	2005
Wholly/semi-milled rice	33	5	5	7	7	4	5
Maize (corn)	59	9	9	8	10	11	12
Live poultry, domestic fowls, ducks, geese, etc.	52	9	10	9	11	6	7
Frozen meat of bovine animals	61	14	11	9	8	10	9
Apples (fresh)	49	13	11	6	5	8	6
Oranges (fresh/dried)	32	5	5	5	4	7	6
Onions and shallots (fresh/chilled)	38	8	11	5	6	2	6
Garlic (fresh/chilled)	14	3	3	2	2	1	3
Total	**339**	**66**	**65**	**51**	**53**	**49**	**55**

[3] Standard error of the mean was used to link the characteristics of the variation of the data to the supposed population where it came from.

Table 3. Descriptive statistics of the FOB and quantity of the Philippine imports and exports of the exporting country, by commodity, 2000-2005.

Commodity/Statistics	FOB (in US $)		Quantity (in GK)	
	Phil Imports	Exports	Phil Imports	Exports
Wholly/semi-milled rice				
No. of trading countries	33	33	33	33
Total (000)	1,249,003.8	1,391,686.0	5,771,886.6	4,149,675.8
Mean (000)	37,848.6	42,172.3	174,905.7	125,747.8
Std. error of the mean (000)	14,589.1	15,172.9	57,865.5	35,091.3
Coefficient of variation	38.5	36.0	33.1	27.9
Maize (corn)				
No. of trading countries	59	59	59	59
Total (000)	167,552.3	190,502.0	971,122.5	1,350,998.1
Mean (000)	2,839.9	3,228.8	16,459.7	22,898.3
Std. error of the mean (000)	748.0	776.1	6,110.4	7,585.1
Coefficient of variation	26.3	24.0	37.1	33.1
Live poultry, domestic fowls, ducks, geese, etc. (traded in gross kilograms)				
No. of trading countries	15	15	15	15
Total (000)	8,212.6	9,695.6	140.1	111.9
Mean (000)	547.5	646.4	9.3	7.5
Std. error of mean (000)	67.5	99.9	1.8	1.2
Coefficient of variation	12.3	15.5	19.4	16.0
Live poultry, domestic fowls, ducks, geese, etc. (traded in no. of heads)				
No. of trading countries	37	37	37	37
Total (000)	34,772.4	29,858.4	7,682.9	8,389.7
Mean (000)	939.8	807.0	207.6	226.7
Std. error of mean (000)	199.3	185.2	43.8	50.8
Coefficient of variation	21.2	22.9	21.1	22.4
Frozen meat of bovine animals				
No. of trading countries	61	61	61	61
Total (000)	543,788.8	541,768.2	543,275.6	474,801.0
Mean (000)	8,914.6	8,881.4	8,906.2	7,783.6
Std. error of the mean (000)	2,062.5	1,840.5	2,193.6	1,795.2
Coefficient of variation	23.1	20.7	24.6	23.1
Apples (fresh)				
No. of trading countries	49	49	49	49
Total (000)	56,003.2	142,680.2	317,455.6	375,982.0
Mean (000)	1,142.9	2,911.8	6,478.7	7,673.1
Std. error of the mean (000)	367.5	936.5	2,190.0	2,580.1
Coefficient of variation	32.2	32.2	33.8	33.6

Table 3. Descriptive statistics of the FOB and quantity of the Philippine imports and exports... *(continued)*

Commodity/Statistics	FOB (in US $)		Quantity (in GK)	
	Phil Imports	Exports	Phil Imports	Exports
Oranges (fresh/dried)				
No. of trading countries	32	32	32	32
Total (000)	10,154.6	14,084.8	57,235.9	27,664.4
Mean (000)	317.3	440.2	1,788.6	864.5
Std. error of the mean (000)	68.7	110.2	428.9	207.3
Coefficient of variation	21.7	25.0	24.0	24.0
Onions and shallots (fresh/chilled)				
No. of trading countries	38	38	38	38
Total (000)	9,254.7	19,868.8	79,689.8	147,702.7
Mean (000)	243.5	522.9	2,097.1	3,886.9
Std. error of the mean (000)	71.6	160.7	667.1	1,246.2
Coefficient of variation	29.4	30.7	31.8	32.1
Garlic (fresh/chilled)				
No. of trading countries	14	14	14	14
Total (000)	17,102.7	75,111.3	92,202.2	217,937.0
Mean (000)	1,221.6	5,365.1	6,585.9	15,566.9
Std. error of the mean (000)	456.3	2,144.1	2,503.0	6,004.5
Coefficient of variation	37.4	40.0	38.0	38.6

Table 4 presents the Philippine import statistics and the corresponding export statistics of the exporting countries, by commodity and year. The percentage differences between the trade statistics for each commodity vary tremendously for all the years in review. For the FOB values, the percentage differences range from a low of -79.7 percent in the case of garlic for year 2004 to a high of 67.9 percent in the case of live poultry for 2005. For the traded quantity in kilograms, the percentage differences range from a low of -93.7 percent for maize (corn) in 2005 to a high of 379.3 percent in the case of oranges. This could possibly be due to the significant over-reporting of exports, especially for products receiving export subsidies, or to the under-reporting of imports as importers attempt to evade tariffs (Bhagwati 1964; 1967; and Sheik 1974, as cited in Yeats 1995). Furthermore, the inclusion of re-exports[4] in the export statistics of the trading partner could also explain the differences noted between the Philippine imports and exports of the trading partner since re-exported goods from the partner country are not included in the import statistics because of the country of origin principle[5].

Of the eight commodities considered, two commodities take opposite directions in their recorded percentage differences for the years in review. For example, live poultry measured in number of head posts a positive percentage difference in FOB value, yet records a negative

[4] Goods of foreign origin that enter a country's consumption and are sold without any substantial transformation in that country

[5] Country of origin is the country of manufacture, production, or growth where an article or product comes from.

Table 4. Percent difference and Implicit Minimal Measurement Error (IMME) for Philippine imports and exports of exporting countries, by commodity, 2000-2005.

Commodity/ Year	Philippine Imports		Exports of the Exporting Countries		% Difference Over Foreign Exports		Implicit Minimal Measurement Error (%)		Derived Unit Price (in US$)	
	FOB (in '000 US$)	Quantity (in '000 GK)	FOB (in '000 US$)	Quantity (in '000 GK)	FOB	Quantity	FOB	Quantity	Philippine Imports	Exports of the Exporting Countries
Wholly/semi milled rice	**1,249,003.7**	**5,771,886.7**	**1,391,685.9**	**4,149,675.8**	**-10.3**	**-39.1**	**-5.4**	**-16.4**	**0.22**	**0.34**
2000	22,515.9	104,206.4	37,697.9	163,540.5	-40.3	-36.3	-25.2	-22.2	0.22	0.23
2001	136,329.2	810,155.2	148,668.3	552,734.1	-8.3	46.6	-4.3	18.9	0.17	0.27
2002	211,397.7	1,199,177.8	284,513.3	995,030.0	-25.7	20.5	-14.7	9.3	0.18	0.29
2003	148,150.0	836,563.6	193,545.2	726,553.2	-23.5	15.1	-13.3	7.0	0.18	0.27
2004	232,967.1	1,002,060.7	224,177.3	591,993.5	3.9	69.3	1.9	25.7	0.23	0.38
2005	497,643.8	1,819,723.0	503,083.9	1,119,824.5	-1.1	62.5	-0.5	23.8	0.27	0.45
Maize (corn)	**167,552.3**	**971,122.5**	**190,502.0**	**1,350,998.0**	**-12.0**	**-28.1**	**-6.4**	**-16.4**	**0.17**	**0.14**
2000	57,406.0	447,750.2	58,800.5	537,030.5	-2.4	-16.6	-1.2	-9.1	0.13	0.11.
2001	25,460.9	176,488.9	36,416.1	283,203.6	-30.1	-37.7	-17.7	-23.1	0.14	0.13
2002	43,332.5	248,933.8	31,646.5	232,944.5	36.9	6.9	15.6	3.3	0.17	0.14
2003	15,623.4	61,532.9	14,185.4	52,137.6	10.1	18.0	4.8	8.3	0.25	0.27
2004	12,482.3	23,124.3	14,500.1	36,502.9	-13.9	-36.7	-7.5	-22.4	0.54	0.40
2005	13,247.2	13,292.4	34,953.4	209,178.9	-62.1	-93.7	-45.0	-88.1	1.00	0.17
Live poultry, domestic fowls, ducks, geese, etc. (in gross kilograms)	**8,212.6**	**140.1**	**9,695.6**	**111.9**	**-15.3**	**25.2**	**-8.3**	**11.2**	**58.62**	**86.66**
2000	796.5	12.3	732.4	10.5	8.8	16.2	4.2	7.5	65.00	69.46
2001	1,085.9	30.0	1,201.6	24.4	-9.6	22.9	-5.1	10.3	36.21	49.25
2002	1,066.8	23.8	1,410.6	22.2	-24.4	6.9	-13.9	3.3	44.88	63.41
2003	2,081.7	39.4	2,194.2	27.6	-5.1	42.7	-2.6	17.6	52.79	79.40
2004	1,867.6	23.4	2,429.1	16.7	-23.1	39.6	-13.1	16.5	79.96	145.22
2005	1,314.0	11.3	1,727.7	10.3	-24.0	9.5	-13.6	4.5	116.18	167.24

Table 4. Percent difference and Implicit Minimal Measurement Error (IMME) for Philippine imports and exports... *(continued)*

Commodity/ Year	Philippine Imports		Exports of the Exporting Countries		% Difference Over Foreign Exports		Implicit Minimal Measurement Error (%)		Derived Unit Price (in US$)	
	FOB (in '000 US$)	Quantity (in '000 GK)	FOB (in '000 US$)	Quantity (in '000 GK)	FOB	Quantity	FOB	Quantity	Philippine Imports	Exports of the Exporting Countries
Live poultry, domestic fowls, ducks, geese, etc. (in no. of head)	**34,772.4**	**7,682.9**	**29,858.4**	**8,389.7**	**16.5**	**-8.4**	**7.6**	**-4.4**	**4.53**	**3.56**
2000	5,975.3	1,495.9	4,405.4	1,451.4	35.6	3.0	15.1	1.5	3.99	3.00
2001	6,704.5	1,773.6	7,506.0	2,018.1	-10.7	-12.1	-5.6	-6.5	3.78	3.72
2002	8,234.2	2,119.1	7,518.3	2,713.4	9.5	-21.9	4.5	-12.3	3.89	2.77
2003	5,854.7	1,126.9	4,537.5	897.9	29.0	25.5	12.7	11.3	5.20	5.05
2004	4,363.3	662.3	3,723.1	690.4	17.2	-3.6	7.9	-1.9	6.56	5.39
2005	3,640.3	502.1	2,168.1	618.0	67.9	-18.8	25.4	-10.4	7.25	3.51
Meat of bovine animals, frozen	**543,788.8**	**543,275.6**	**541,768.2**	**474,801**	**0.4**	**14.4**	**0.2**	**6.7**	**1.00**	**1.14**
2000	88,884.7	82,508.8	83,345.3	74,298.0	6.6	11.1	3.2	5.2	1.08	1.12
2001	81,215.8	77,745.6	83,872.7	79,926.8	-3.2	-2.7	-1.6	-1.4	1.04	1.05
2002	81,698.9	86,522.5	75,626.0	77,623.9	8.0	11.5	3.9	5.4	0.94	0.97
2003	80,384.4	88,018.3	87,499.1	83,246.0	-8.1	5.7	-4.2	2.8	0.91	1.05
2004	107,834.1	112,179.1	100,994.8	81,116.8	6.8	38.3	3.3	16.1	0.96	1.25
2005	103,770.9	96,301.3	110,430.3	78,589.5	-6.0	22.5	-3.1	10.1	1.08	1.41
Oranges, fresh/ dried	**10,154.6**	**57,235.9**	**14,084.8**	**27,664.4**	**-27.9**	**106.9**	**-16.2**	**34.8**	**0.18**	**0.51**
2000	1,891.7	11,538.9	3,843.1	6,580.1	-50.8	75.4	-34.0	27.4	0.16	0.58
2001	959.4	3,967.3	2,850.4	5,331.9	-66.3	-25.6	-49.6	-14.7	0.24	0.53
2002	1,862.2	8,933.2	1,609.1	3,819.5	15.7	133.9	7.3	40.1	0.21	0.42
2003	1,253.1	6,926.2	1,826.1	4,459.0	-31.4	55.3	-18.6	21.7	0.18	0.41
2004	1,504.2	8,797.6	1,943.0	3,911.9	-22.6	124.9	-12.7	38.4	0.17	0.50
2005	2,684.0	17,072.7	2,013.1	3,562.0	33.3	379.3	14.3	65.5	0.16	0.57

Table 4. Percent difference and Implicit Minimal Measurement Error (IMME) for Philippine imports and exports... *(continued)*

Commodity/ Year	Philippine Imports		Exports of the Exporting Countries		% Difference Over Foreign Exports		Implicit Minimal Measurement Error (%)		Derived Unit Price (in US$)	
	FOB (in '000 US$)	Quantity (in '000 GK)	FOB (in '000 US$)	Quantity (in '000 GK)	FOB	Quantity	FOB	Quantity	Philippine Imports	Exports of the Exporting Countries
Apples, fresh	**56,003.1**	**317,455.6**	**142,680.3**	**375,982.0**	**-60.8**	**-15.6**	**-43.6**	**-8.4**	**0.18**	**0.38**
2000	12,237.1	66,150.6	27,098.4	77,708.1	-54.8	-14.9	-37.8	-8.0	0.18	0.35
2001	9,272.3	47,942.4	16,223.4	40,897.1	-42.8	17.2	-27.3	7.9	0.19	0.40
2002	8,108.6	47,474.7	20,150.1	53,927.2	-59.8	-12.0	-42.6	-6.4	0.17	0.37
2003	9,188.7	60,038.0	25,833.2	72,525.0	-64.4	-17.2	-47.5	-9.4	0.15	0.36
2004	6,463.0	42,203.6	25,554.8	67,201.7	-74.7	-37.2	-59.6	-22.8	0.15	0.38
2005	10,733.4	53,646.3	27,820.4	63,722.9	-61.4	-15.8	-44.3	-8.6	0.20	0.44
Garlic, fresh/ chilled	**17,102.7**	**92,202.2**	**75,111.3**	**217,937.0**	**-77.2**	**-57.7**	**-62.9**	**-40.5**	**0.19**	**0.34**
2000	879.8	5,016.0	1,093.8	3,976.8	-19.6	26.1	-10.8	11.6	0.18	0.28
2001	1,345.3	5,937.6	5,350.4	17,685.0	-74.9	-66.4	-59.8	-49.7	0.23	0.30
2002	3,171.4	15,783.8	13,763.6	44,634.9	-77.0	-64.6	-62.6	-47.8	0.20	0.31
2003	3,287.8	18,772.8	14,827.4	47,599.4	-77.8	-60.6	-63.7	-43.4	0.18	0.44
2004	3,742.1	20,931.5	18,415.4	54,684.2	-79.7	-61.7	-66.2	-44.6	0.18	0.34
2005	4,676.3	25,760.5	21,660.7	49,356.8	-78.4	-47.8	-64.5	-31.4	0.18	0.44
Onions and shallots fresh/ chilled	**9,254.7**	**79,689.8**	**19,868.7**	**147,702.6**	**-53.4**	**-46.1**	**-36.4**	**-29.9**	**0.12**	**0.13**
2000	1,179.1	8,545.5	1,656.7	17,567.5	-28.8	-51.4	-16.8	-34.6	0.14	0.09
2001	2,131.5	17,945.2	4,877.3	45,562.1	-56.3	-60.6	-39.2	-43.5	0.12	0.11
2002	697.8	5,941.0	989.8	9,569.5	-29.5	-37.9	-17.3	-23.4	0.12	0.10
2003	1,335.6	11,081.8	2,505.9	19,268.6	-46.7	-42.5	-30.5	-27.0	0.12	0.13
2004	870.0	6,905.2	2,063.7	15,368.8	-57.8	-55.1	-40.7	-38.0	0.13	0.13
2005	3,040.7	29,271.1	7,775.3	40,366.1	-60.1	-27.5	-43.8	-15.9	0.10	0.19

percentage difference in terms of trade quantity. This is noted in the bilateral transactions of Malaysia (2000), India (2001), USA (2002) and Netherlands (2000, 2001 and 2005). Meanwhile, the reverse is true for oranges and live poultry in gross kilograms. Their respective percentage differences in FOB value are negative, while those from volume of quantity traded are positive. This is observed in bilateral transactions in oranges for Hong Kong (2000), Thailand (2001), Singapore (2004) and USA (2005); as well as in live poultry transactions for Germany (2003-2005), Denmark (2003), and United Kingdom (2000 and 2002).

Percentage differences observed for frozen meat are relatively lower than those for the other commodities under study. This may be due to the homogeneous composition of processed commodities under this tariff heading which uses the four-digit Harmonized Commodity Description and Coding System (HS) level. The HS of tariff nomenclature, as developed and maintained by the World Customs Organization (WCO), is an internationally standardized system of names and numbers for classifying traded products. It is a six-digit nomenclature where the first four digits are referred to as the heading and the first six digits are known as a subheading. Countries that have adopted the Harmonized System are not permitted to alter in any way the descriptions associated to a heading or a subheading nor can the numerical codes at the four- or six-digit level be altered. This is what makes the Harmonized System integrated and consistent.

Although maize (corn) and live poultry have the same HS-level as frozen meat, their percentage differences on FOB values and quantities register large variations. This may be due to the heterogeneity of the commodities under their respective tariff heading. For example, corn includes seed and other corn products including popcorn; while live poultry includes animals weighing not more than 185 grams to those more than 2000 grams, as well as gamecocks for cock fighting. For the rest of the commodities, the variability in the percentage differences both in the FOB values and quantities could be attributed to a more disaggregated six-digit HS level classification. These findings confirm Yeats' (1995) observation that the reliability of partner-country statistics degenerates as one moves from highly aggregated commodities to more finely distinguished trade categories.

The computed IMMEs show significant improvement (smaller values) in the percentage differences between the trade statistics for all the commodities under study (Table 4). This is notably seen in the percentage difference on the FOB values of rice, corn, live poultry, and frozen meat; and on the quantity of live poultry (in number of heads), frozen meat, and apples.

Since it can be considered an optimistic indicator of the reliability of the foreign trade statistics, the IMMEs can be compared with the CV where a threshold value of up to 10 percent is used to say that such estimates are relatively reliable (e.g., small sample estimates). Despite the significant improvement in the percentage values of IMMEs, most of them are still above 10 percent, implying that the FOB value and quantity of trade data of the Philippines and partner exporting countries are still highly divergent.

The derived unit prices can also provide some measures of data accuracy. This study finds that the derived unit prices from the exports of the exporting countries are much higher than those from the Philippine imports for rice, frozen meat, apples, oranges, and garlic. However, the reverse is true for corn and live poultry (in number of head) for which a much higher derived unit price is noted in the Philippine imports (Table 4). This is due to the diversity in the composition of these tariff headings.

Interestingly, unit prices derived for onions based on exports and on Philippine imports do

not differ much, although the reported FOB values and quantities differ by a range of 27.5 percent to 61.0 percent. This implies that, on average, the data reported by both countries are reasonably reliable in terms of their unit transaction value.

Despite the compliance of all trading countries with the United Nations guidelines for trade statistics (see the *International Merchandise Trade Compilers Manual*)[6], differences between trading partners' data still remain. For example, the UN guidelines prescribe to trading countries the use of the Harmonized Commodity Description and Coding System (HS) in processing trade data. However, differences in the interpretation and implementation of the HS codes may result in some traded commodities being misclassified. Results of this study show that this is true for the Philippines and its exporting country partners.

As discussed during the 29th Meeting of the Standing Committee of Caribbean Statisticians (held last November 2004 in Hamilton, Bermuda), differences in the trade system[7] may explain disparities in the merchandise trade data between countries. The General Trade System[8] is in use when the statistical territory of a country coincides with its economic territory; that is, imports include all goods entering the economic territory of a compiling country and exports include all goods leaving the economic territory of the compiling country. The Special Trade System[9], on the other hand, is in use when the statistical territory comprises only a particular part of the economic territory. Under this system, goods are recorded only when they enter into domestic circulation or for inward processing in the country of receipt. Therefore, goods entering into the free trade zones or customs warehouse are excluded from trade at the time of importation but are subsequently recorded at the time of release for domestic use or inward processing. Similarly, outgoing goods from customs warehouses are not recorded as exports.

Table 5 shows the trade practices and the commodities traded by the exporting countries included in this study. Like the Philippines, majority (about 65.6 percent) of the exporting countries use the General Trade System, while the remaining countries (34.4 percent) use the Special Trade System. Thus, the apparent discrepancy between the Philippine import figures and the export statistics of the exporting countries could be due to the differences in the trade system used. The countries using the special system will not account for goods moving between premises for customs warehousing and customs free zones of countries using the general system. This is true for Argentina, Belgium, Chile, Denmark, France, Italy, Spain, Switzerland, Thailand and Vietnam as these countries use the Special Trade System.

Another source of discrepancy in reporting bilateral trade data is the partner-country attribution. Attribution of imports to the country of origin and exports to the country of last known destination can explain many significant

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[6] As recommended by the United Nations Statistical Commission at its 29th session, this manual has been prepared to primarily assist the UN Member States in the implementation of the methodological guidelines adopted by the Commission and laid out in *International Merchandise Trade Statistics: Concepts and Definitions, Revision 2*. The manual may also serve as a guide to users who wish to understand better the nature of trade data.

[7] There are two trade systems in common use by which the international merchandise trade statistics are compiled: the general trade system and the special trade system.

[8] UN's recommended trade system for compiling and recording the country's international merchandise trade statistics.

[9] Another type of trade system used in the compilation and recording the country's international merchandise trade statistics.

Table 5. Trade practices and commodities, by country.

Exporting Country	Country of Attribution	Timing of Recording	Threshold Value (in US$)	Trade Commodities
A. General Trade System				
1. Australia	Last known destination	Date goods enter/leave the economic territory	101-499	Frozen meat of bovine animals, oranges (fresh/dried), apples (fresh), maize (corn), live poultry domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), and garlic (fresh/chilled)
2. Brazil	-- do --	Date of customs clearance	500-999	Frozen meat of bovine animals, oranges (fresh/dried) and apples (fresh)
3. Canada	-- do --	-- do --	-- do --	Frozen meat of bovine animals, maize (corn), apples (fresh) and live poultry, domestic fowls, ducks, geese, etc
4. China	-- do --	-- do --	None	Oranges (fresh/dried), maize (corn), onions and shallots (fresh/chilled), garlic (fresh/chilled), apples (fresh) and rice (wholly/semi-milled)
5. Germany	-- do --	-- do --	500-999	Live poultry, domestic fowls, ducks, geese, etc. and frozen meat of bovine animals
6. Hong Kong	-- do --	Date of shipment	None	Frozen meat of bovine animals, apples (fresh), oranges (fresh/dried), onions and shallots (fresh/chilled), and garlic (fresh/chilled)
7. India	-- do --	Date of customs clearance	None	Live poultry, domestic fowls, ducks, geese, etc ; frozen meat of bovine animals, garlic (fresh/chilled), onions and shallots (fresh/chilled), maize (corn) and rice (wholly/semi-milled)
8. Indonesia	Last known destination	Date of customs clearance	<999	Live poultry, domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), and maize (corn)
9. Ireland	-- do --	-- do --	101-499	Frozen meat of bovine animals
10. Japan	-- do --	Date of vessel's departure	<999	Live poultry, domestic fowls, ducks, geese, etc.; frozen meat of bovine animals, onions and shallots (fresh/chilled), and apples (fresh)
11. Malaysia	-- do --	Not available	101-499	Frozen meat of bovine animals, apples (fresh), live poultry and domestic fowls, onions and shallots (fresh/chilled), garlic (fresh/chilled) and rice (wholly/semi-milled)
12. Netherlands	-- do --	Date of goods enter/leave the economic territory	None	Frozen meat of bovine animals, live poultry, domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), and maize (corn)
13. New Zealand	-- do --	Date of customs clearance	101-499	Frozen meat of bovine animals, apples (fresh), live poultry, domestic fowls, ducks, geese, etc; and onions and shallots (fresh/chilled)
14. Pakistan	Last known destination	Not available	Not Available	Oranges (fresh/dried) and rice (wholly/semi-milled)

Table 5. Trade practices and commodities... *(continued)*

Exporting Country	Country of Attribution	Timing of Recording	Threshold Value (in US$)	Trade Commodities
A. General Trade System				
15. Republic of Korea	-- do --	Date of customs clearance	None	Apples (fresh), onions and shallots (fresh/chilled)
16. Singapore	-- do --	Date of declaration	101-499	Frozen meat of bovine animals, oranges (fresh/dried), apples (fresh), onions and shallots (fresh/chilled), and rice (wholly/ semi-milled)
17. South Africa	-- do --	Not available	Not available	Live poultry, domestic fowls, ducks, geese, etc.; oranges (fresh/dried), and maize (corn)
18. United Kingdom	-- do --	Date of receipt of the source documents at the statistical agency	None	Live poultry, domestic fowls, ducks, geese, etc.
19. USA	-- do --	Date of goods enter/leave the economic territory	<2,501	Frozen meat of bovine animals, apples (fresh), oranges (fresh/dried), maize (corn), live poultry, domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), garlic (fresh/ chilled) and rice (wholly/semi-milled)
20. Philippines	Country of origin	Date of goods enter/leave the economic territory	<25	Frozen meat of bovine animals, apples (fresh), oranges (fresh/dried), maize (corn), live poultry, domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), garlic (fresh/ chilled) and rice (wholly/ semi-milled)
B. Special Trade System				
1. Argentina	Last known destination	Date of customs clearance	None	Frozen meat of bovine animals, oranges (fresh/dried), and maize (corn)
2. Belgium	-- do --	-- do --	500-999	Live poultry, domestic fowls, ducks, geese, etc
3. Denmark	-- do --	Date of goods enter/leave the economic territory	-- do --	Live poultry, domestic fowls, ducks, geese, etc.; and frozen meat of bovine animals
4. Italy	-- do --	Date of customs clearance	101-499	Rice (wholly/semi-milled)

Table 5. Trade practices and commodities... *(continued)*

Exporting Country	Country of Attribution	Timing of Recording	Threshold Value (in US$)	Trade Commodities
B. Special Trade System				
5. Spain	-- do --	-- do --	500-999	Frozen meat of bovine animals
6. Switzerland	-- do --	-- do --	-- do --	Apples (fresh)
7. Thailand	-- do --	-- do --	None	Frozen meat of bovine animals, apples (fresh), oranges (fresh/dried), maize (corn), live poultry, domestic fowls, ducks, geese, etc.; onions and shallots (fresh/chilled), garlic (fresh/chilled) and rice (wholly/semi-milled)
8. Chile	Last known destination	Date of goods enter/leave the economic territory	1,000	Apples (fresh) and maize (corn)
9. France	Country of consumption or home use	Date of customs clearance	500-999	Live poultry, domestic fowls, ducks, geese, etc.; and frozen meat of bovine animals
10. Vietnam	Country of sale	-- do --	None	Rice (wholly/semi-milled) and maize (corn)

differences between the statistics of the trading partners in cases when goods move from the country of origin to the country of destination via a third country for transshipment. This is also true when the trading partners have different rules of origin, resulting in differences in the recording of trade flows. Table 5 shows that only Vietnam and France consider the country of sale and country of consumption or home use as their country of destination, respectively. The Philippines and the rest of the exporting countries report the last known destination as their country of destination.

The method of compiling data by country of last known destination offers the possibility of obtaining consistent statistics and reasonable comparability since it promotes the recording of the same transactions by the importing and exporting countries. This approach can result in symmetrical data sets if there are no commercial transactions or other operations that can change the legal status of the goods during the transport from the exporting country to the importing country.

However, if the goods are being subjected to any commercial transactions or other operations which can change the legal status of the goods while being transported via third country or through international waters, the import and export records of the countries involved might not provide such asymmetry due to the following reasons: a) value addition through further processing; b) cost of related services (e.g., shipping costs); and c) profit mark-ups. It may also happen that the entire value of transaction is attributed to the country that may only be the location of a distribution warehouse or middleman. In addition, there can be lack of information about the destination of the goods at the time of export or the places where it can be redirected while at sea. Moreover, goods can be transshipped from the original country of destination; hence, not included in the country's imports.

The differences in timing of recording shipments could also be a source of discrepancy. Documentation may be made in any of the following stages, namely: a) transferring of shipments to the point from which the international carrier will depart; b) warehousing while waiting for international transport; c) arriving at the point of destination; and d) warehousing while waiting to clear customs formalities. Furthermore, the various documents filed at different stages could be recorded on the basis of different conventions.

For example, one country may attribute the trade flow to the time period in which the invoice is received in the importing country, while another country may attribute the transaction to the time period in which the amount owed to the customs administration is paid. As a result, a given import may be recorded as having occurred in a different month/year, as compared with the counterpart information filed on its export by the trading partner. Bhagwati (1974), however, points out that the effect of this factor shows up in an annual import data only if the import level changes over time. If the import level shows a constant trend, then the discrepancies due to lags in recording would be offset from year to year.

Table 5 shows that majority (58.6 percent) of the trading partners use the date of customs clearance as their date of recording export statistics, while the remaining exporting countries use different dates as follows: a) date when the goods leave their economic territory (17.2 percent); b) date of shipment (3.4 percent); c) date of vessel's departure (3.4 percent); d) date of declaration (3.4 percent); and e) date of receipt of the source documents at the statistical agency (3.4 percent). As shown, Malaysia, Pakistan, and South Africa do not provide information as to when they record their exports. On the other hand, the practice in the Philippines is to record its imports on the date when the goods enter the economic territory.

Other sources of disparity in bilateral trade statistics may also include differences in reporting practices of the partner countries, namely: a) in the deadline for reporting statistical information; b) the use of summary reporting; c) the definition of the reporting period; and d) the procedures for handling late or incorrect records.

The threshold values of the merchandise trade statistics used by different exporting countries can also be a source of statistical discrepancy. For example, the Philippines excludes from the compilation of merchandise trade statistics imported commodities worth less than US$25 in FOB value. Of the 29 exporting countries, 18 countries or 62.1 percent have threshold values ranging from a low of US$101 to a high of US $2,501 (Table 5).

Other possible sources of discrepancy are the interpretation and application of the commodity classification. Although all major trading countries have adopted the Harmonized System (HS) for commodity classification, there are still differences in its interpretation and application within the country and among the different countries.

The statistics across commodities by exporting countries shown in Table 6 reveal that percentage differences for the FOB values range from a low of -81.1 percent (Malaysia) to a high of 224.5 percent (Belgium), while those for traded quantity range from -93.3 percent (Spain) to 1,118.5 percent (Switzerland). These are due to the following conceptual differences: (a) timing of recording for Argentina, Brazil, Canada, People's Republic of China, France, Germany, Hong Kong, Indonesia, Ireland, Italy, New Zealand, Thailand, and United Kingdom; (b) trade system for Belgium, Denmark, France, Switzerland, and Vietnam; (c) threshold value for Argentina, People's Republic of China, Hong Kong, Singapore, Thailand, and United Kingdom; (d) partner- country attribution for France, and Vietnam; (e) entrepõt trade for People's Republic of China, Hong Kong, and Singapore; and (f) HS classification for Malaysia, South Africa, Spain, USA, and United Kingdom.

Aside from these conceptual differences, the discrepancy noted between the Philippine imports and the exports from Australia, Brazil, Canada, People's Republic of China, France, Germany, Hong Kong, India, Ireland, Japan, New Zealand, Netherlands, Pakistan, Republic of Korea, Thailand, United Kingdom, USA, and Vietnam could be due to the possibility of under-reporting imports to avoid high tariff duties or over-reporting exports to avail of the export subsidies, as mentioned in the studies of Bhagwati (1964; 1967) and Sheik (1974), both cited in Yeats (1995). This is supported by the observed differences in the derived unit prices for both the Philippine imports and the exports of the trading partners.

Results of Nonparametric Tests

The Wilcoxon-MPSR test was used to determine if the differences between the reported import figures of the Philippines and the exports of the exporting countries were significant. The test was applied to the: (1) FOB values, (2) traded quantities, and (3) the derived unit prices, by year, commodity, and country.

Of the eight commodities considered, three show significant differences in the FOB values, while only two commodities do so in terms of traded quantities (Table 7). This implies that the differences in the FOB values of apples, onions, and garlic between the Philippine imports and exports of the exporting countries do exist and are significant. This also holds true for the differences in the traded quantities of onions and garlic.

The significance noted in the FOB values is due to the significant differences observed in the bilateral trade with China and the USA for apples, Netherlands and China for onions and

Table 6. Statistics across commodities by exporting country, 2000-2005.

Exporting Country	Philippine Imports		Exports of the Exporting Countries		% Difference		Implicit Minimal Measurement Error (%)		Derived Unit Price (in US$)	
	FOB (in '000 US$)	Quantity (in '000 GK)	FOB (in '000 US$)	Quantity (in '000 GK)	FOB	Quantity	FOB	Quantity	Philippine Imports	Exports of the Exporting Countries
Argentina	6,514.3	52,954.2	15,605.0	143,684.6	-58.3	-63.2	-41.1	-46.1	0.12	0.11
Australia (gross kilograms)	91,781.6	71,743.7	93,680.3	67,000.2	-2.0	7.1	-1.0	3.4	1.28	1.40
Australia (no. of head)	125.4	75.4	129.5	64.0	-3.1	17.8	-1.6	8.2	1.66	2.02
Belgium	54.3	8.7	16.7	4.4	224.5	97.3	52.9	32.7	6.25	3.80
Brazil	100,929.9	99,088.2	120,010.0	103,370.2	-15.9	-4.1	-8.6	-2.1	1.02	1.16
Canada (gross kilograms)	2,883.9	3,616.8	8,042.3	11,753.3	-64.1	-69.2	-47.2	-52.9	0.80	0.68
Canada (no. of head)	1,984.8	373.9	1,222.3	232.1	62.4	61.1	23.8	23.4	5.31	5.27
Chile	39.7	277.5	188.5	536.5	-78.9	-48.3	-65.2	-31.8	0.14	0.35
People's Republic of China	132,108.2	915,837.4	265,228.8	1,200,954.5	-50.2	-23.7	-33.5	-13.5	0.14	0.22
Denmark	2,663.3	2,230.1	2,306.3	1,893.5	15.5	17.8	7.2	8.2	1.19	1.22
France (gross kilograms)	519.8	535.5	677.7	510.5	-23.3	4.9	-13.2	2.4	0.97	1.33
France (no. of head)	2,669.1	813.8	3,058.2	1,033.9	-12.7	-21.3	-6.8	-11.9	3.28	2.96
Germany	8,905.5	4,848.6	11,074.0	5,680.6	-19.6	-14.7	-10.9	-7.9	1.84	1.95
Hong Kong	2,940.7	17,916.3	6,096.3	10,567.9	-51.8	69.5	-34.9	25.8	0.16	0.58
India	418,385.7	955,095.7	435,184.5	830,259.7	-3.9	15.0	-2.0	7.0	0.44	0.52
Indonesia	7,754.6	5,806.8	9,184.4	20,730.7	-15.6	-72.0	-8.4	-56.2	1.34	0.44
Ireland	6,548.8	6,198.2	7,090.2	5,531.9	-7.6	12.0	-4.0	5.7	1.06	1.28
Italy	0.8	1.3	1.9	1.2	-59.1	9.5	-42.0	4.5	0.60	1.61
Japan (gross kilograms)	385.9	1,286.1	216.3	183.9	78.4	599.5	28.2	75.0	0.30	1.18
Japan (no. of head)	35.6	29.3	40.2	29.8	-11.3	-1.5	-6.0	-0.8	1.22	1.35
Malaysia (gross kilograms)	177.5	867.5	937.6	2,545.1	-81.1	-65.9	-68.2	-49.2	0.20	0.37
Malaysia (no. of head)	981.0	206.2	388.6	236.9	152.5	-13.0	43.3	-6.9	4.76	1.64
Netherlands (gross kilograms)	8,583.4	23,119.8	7,339.4	23,410.1	17.0	-1.2	7.8	-0.6	0.37	0.31
Netherlands (no. of head)	10,098.9	3,409.3	10,923.7	3,627.6	-7.6	-6.0	-3.9	-3.1	2.96	3.01
New Zealand (gross kilograms)	17,934.9	20,055.3	26,232.7	22,864.5	-31.6	-12.3	-18.8	-6.6	0.89	1.15

Table 6. Statistics across commodities by exporting country, 2000-2005.

Exporting Country	Philippine Imports		Exports of the Exporting Countries		% Difference		Implicit Minimal Measurement Error (%)		Derived Unit Price (in US$)	
	FOB (in '000 US$)	Quantity (in '000 GK)	FOB (in '000 US$)	Quantity (in '000 GK)	FOB	Quantity	FOB	Quantity	Philippine Imports	Exports of the Exporting Countries
Pakistan	9,637.2	47,435.7	9,322.4	45,599.0	3.4	4.0	1.7	2.0	0.20	0.20
Republic of Korea	48.0	279.0	106.4	148.2	-54.9	88.2	-37.9	30.6	0.17	0.72
Singapore	3,315.5	10,968.0	1,645.7	4,212.0	101.5	160.4	33.7	44.5	0.30	0.39
South Africa (gross kilograms)	4,400.4	2,641.2	3,826.5	3,375.2	15.0	-21.8	7.0	-12.2	1.67	1.13
Spain	87.5	4.7	77.4	69.8	13.0	-93.3	6.1	-87.4	18.68	1.11
Switzerland	1.5	9.2	2.4	0.8	-35.6	1,118.5	-21.7	84.8	0.17	3.17
Thailand (gross kilograms)	210,834.0	1,013,895.8	211,231.8	1,037,387.1	-0.2	-2.3	-0.1	-1.2	0.21	0.20
Thailand (no. of heads)	1,138.8	528.2	668.7	340.7	70.3	55.0	26.0	21.6	2.16	1.96
United Kingdom	3,535.6	61.3	4,137.9	48.8	-14.6	25.6	-7.9	11.4	57.7	84.8
USA (gross kilograms)	188,829.8	921,102.7	246,471.4	1,150,129.4	-23.4	-19.9	-13.2	-11.1	0.21	0.21
USA (no. of heads)	17,608.8	2,195.8	13,355.6	2,739.3	31.9	-19.8	13.7	-11.0	8.02	4.88
Vietnam	831,307.6	3,655,050.5	899,453.0	2,052,305.2	-7.6	78.1	-3.9	28.1	0.23	0.44

Table 7. Wilcoxon-MPSR test statistics by commodity, 2000-2005.

Commodity	FOB Values (in US$)		Quantity (Gross Kilograms)		Derived Unit Price (in US$)	
	Z-value	P-value	*Z*-value	P-value	*Z*-value	P-value
Overall	***-4.764****	***0.000***	***-1.244***	***0.214***	***-8.893****	***0.000***
Wholly or semi-milled rice	-1.313	0.189	-1.047	0.295	-3.225**	0.001
Maize (corn)	-0.716	0.474	-0.536	0.592	-1.374	0.170
Live poultry, domestic fowls, ducks, geese, etc [a/]	-0.701	0.483	-0.244	0.807	-0.838	0.402
In gross kilograms	-1.704	0.088	-1.874	0.061	-3.067**	0.002
In number of heads	-1.758	0.079	-0.456	0.649	-2.074*	0.038
Frozen meat of bovine animals	-1.785	0.074	-1.929	0.054	-4.740**	0.000
Apples (fresh)	-3.795**	0.000	-1.537	0.124	-6.083**	0.000
Oranges (fresh/dried)	-0.711	0.477	-1.178	0.239	-4.656**	0.000
Onions and shallots (fresh/ chilled)	-4.213**	0.000	-3.821**	0.000	-3.763**	0.000
Garlic (fresh/chilled)	-2.605**	0.009	-2.480*	0.013	-3.296**	0.001

[a/] Quantity in number of heads of live poultry, domestic fowls, ducks, geese, etc.
* significant at α= 5%
** significant at α=1%

shallots; and China for garlic. On the quantity side, it is due to the considerable differences observed in the two-way trade with Netherlands and China for onions and shallots; and China for garlic (Table 8).

Although rice, live poultry, frozen meat, and oranges reveal non-significance for both the FOB values and traded quantities, it is worth noting that some of the trading partners in these commodities show significant results in these two variables. For instance, Vietnam (among six trading partners) reveals significant differences in rice in terms of the FOB values and traded quantities; same with France (among eight trading partners) in live poultry measured in number of heads; India and USA (of the 11 trading partners) in frozen meat; and USA, Hong Kong and China (of the eight exporting partners) in oranges. On the FOB values only, USA (of the eight trading partners) shows significance in live poultry measured in number of heads; same with Germany (of the three trading partners) in live poultry measured in gross kilograms; and Brazil in frozen meat (Table 8).

Significant differences between the derived unit price of the Philippine imports and exports of the trading partners are likewise observed on all the commodities covered in the study except for corn (Table 7). These are due to the significant differences noted on the derived unit prices between the Philippine imports and the exports of the following trading partners: a) Pakistan and Vietnam for rice; b) France, Germany, United Kingdom, and USA for live poultry; c) Brazil, New Zealand, and USA for frozen meat; d) Hong Kong, Japan, China, and USA for apples; e) Hong Kong, China, and USA for oranges; f) Netherlands for onions; and g) China for garlic (Table 8).

Year-wise, the results of the Wilcoxon-MPSR test indicate non-significant differences in the reported aggregate traded quantities

Table 8. Wilcoxon-MPSR test statistics, by commodity and exporting country, 2000-2005.

Commodity	FOB Values (in US$)		Quantity (Gross Kilograms)		Derived Unit Price (in US$)	
	Z-value	P-value	*Z*-value	P-value	*Z*-value	P-value
Overall	***-4.764****	***0.000***	***-1.244***	***0.214***	***-8.893****	***0.000***
Wholly or semi-milled rice	-1.313	0.189	-1.047	0.295	-3.225**	0.001
Singapore	0.000	1.000	0.000	0.000	-1.604	0.109
Thailand	-0.314	0.753	-0.734	0.463	-1.782	0.075
United States of America	-0.105	0.917	-0.105	0.917	-0.524	0.600
People's Republic of China	-0.674	0.500	-1.483	0.138	-1.214	0.225
Pakistan	-0.135	0.893	-0.365	0.715	-2.023*	0.043
Vietnam	-2.023*	0.043	-2.023*	0.043	-2.023*	0.043
Maize (corn)	-0.716	0.474	-0.536	0.592	-1.374	0.170
Indonesia	-0.169	0.866	0.000	1.000	-0.676	0.499
Argentina	-1.753	0.080	-1.214	0.225	-0.405	0.686
Australia	-1.342	0.180	-1.342	0.180	-1.342	0.180
Canada	-1.604	0.109	-1.604	0.109	-1.069	0.285
India	-0.314	0.753	-0.314	0.753	-1.782	0.075
Netherlands	-0.447	0.655	-0.447	0.655	-1.342	0.180
Thailand	-0.169	0.866	-1.521	0.128	-0.169	0.866
United States of America	-0.706	0.480	-0.392	0.695	-1.490	0.136
People's Republic of China	-0.944	0.345	-1.214	0.225	-1.153	0.249
South Africa	-0.674	0.500	-1.095	0.273	-1.483	0.138
Vietnam	-1.069	0.285	-0.535	0.593	-1.069	0.285
Live poultry, domestic fowls, ducks, geese, etc [a/]	-0.701	0.483	-0.244	0.807	-0.838	0.402
In gross kilograms	-1.704	0.088	-1.874	0.061	-3.067**	0.002
Germany	-1.992*	0.046	-0.943	0.345	-1.992*	0.046
Indonesia	-1.342	0.180	-1.342	0.180	-1.342	0.180
United Kingdom	-0.734	0.463	-1.363	0.173	-2.201*	0.028
In number of heads	-1.758	0.079	-0.456	0.649	-2.074*	0.038
Australia	-1.342	0.180	-0.447	0.655	-1.342	0.180
Canada	-1.753	0.080	-1.753	0.080	-0.405	0.686
France	-2.201*	0.028	-2.201*	0.028	-2.201*	0.028
Malaysia	-1.342	0.180	-0.447	0.655	-1.342	0.180
Netherlands	-0.524	0.600	-1.363	0.173	-0.314	0.753
New Zealand	-0.447	0.665	-1.000	0.317	-1.342	0.180
Thailand	-1.095	0.273	-1.826	0.068	-0.365	0.715
United States of America	-1.992*	0.046	-0.105	0.917	-2.201*	0.028
Frozen meat of bovine animals	-1.785	0.074	-1.929	0.054	-4.740**	0.000
Germany	-1.342	0.180	-1.342	0.180	-0.447	0.655
Argentina	-1.342	0.180	-1.342	0.180	-1.342	0.180
Australia	-0.524	0.600	-0.105	0.917	-1.363	0.173
Brazil	-2.201*	0.028	-0.943	0.345	-1.992*	0.046
Canada	-0.944	0.345	-1.214	0.225	-1.753	0.080
Hong Kong	-2.023*	0.043	-0.674	0.500	-0.674	0.500
India	-1.992*	0.046	-1.992*	0.046	-1.153	0.249

Table 8. Wilcoxon-MPSR test statistics, by commodity and exporting country... *(continued)*

Commodity	FOB Values (in US$)		Quantity (Gross Kilograms)		Derived Unit Price (in US$)	
	Z-value	P-value	*Z*-value	P-value	*Z*-value	P-value
Frozen meat of bovine animals	-1.785	0.074	-1.929	0.054	-4.740**	0.000
Japan	-1.461	0.144	-1.826	0.068	-1.826	0.068
New Zealand	-1.572	0.116	-0.105	0.917	-1.992*	0.046
Singapore	-1.572	0.116	-1.363	0.173	-1.153	0.249
United States of America	-2.201*	0.028	-2.201*	0.028	-2.201*	0.028
Apples (fresh)	-3.795**	0.000	-1.537	0.124	-6.083**	0.000
Brazil	-1.342	0.108	-1.342	0.180	-0.447	0.655
Canada	-1.604	0.109	-1.604	0.109	-1.604	0.109
Hong Kong	1.363	0.173	-0.734	0.463	-2.201*	0.028
Japan	-0.943	0.345	-2.201*	0.028	-2.201*	0.028
Malaysia	-1.604	0.109	-1.604	0.109	-1.604	0.109
New Zealand	-1.604	0.109	-1.604	0.109	-1.604	0.109
Singapore	-1.604	0.109	-1.604	0.109	-1.604	0.109
United States of America	-2.201*	0.028	-1.992*	0.046	-2.201*	0.028
People's Republic of China	-2.201*	0.028	-1.153	0.249	-2.201*	0.028
Republic of Korea	-0.730	0.465	-0.730	0.465	-1.826	0.068
Chile	-1.604	0.109	-1.604	0.109	-1.604	0.109
Switzerland	-0.447	0.655	-1.342	0.180	-1.342	0.180
Oranges (fresh/dried)	-0.711	0.477	-1.178	0.239	-4.656**	0.000
Australia	-1.826	0.068	-1.826	0.068	-1.826	0.068
Hong Kong	-2.201*	0.028	-1.992*	0.046	-2.201*	0.028
Singapore	-0.447	0.655	-1.342	0.180	-1.342	0.180
Thailand	-1.342	0.180	-0.447	0.655	-1.342	0.180
United States of America	-2.201*	0.028	-1.992*	0.046	-2.201*	0.028
People's Republic of China	-2.023*	0.043	-2.023*	0.043	-2.023*	0.043
Pakistan	-1.604	0.109	-1.604	0.109	-1.604	0.109
South Africa	-1.342	0.180	-1.342	0.180	-0.447	0.655
Onions and shallots (fresh/ chilled)	-4.213**	0.000	-3.821**	0.000	-3.763**	0.000
Indonesia	-0.447	0.655	-1.342	0.180	-0.447	0.655
Australia	-1.342	0.180	-0.447	0.655	-1.342	0.180
Hong Kong	-1.342	0.180	-1.342	0.180	-1.342	0.180
India	-0.946	0.344	-0.946	0.344	-0.946	0.344
Malaysia	-1.604	0.109	-1.604	0.109	-1.604	0.109
Netherlands	-1.992*	0.046	-2.201*	0.028	-1.992*	0.046
New Zealand	-1.604	0.109	-1.604	0.109	-1.604	0.109
United States of America	-1.826	0.068	-1.826	0.068	-1.461	0.144
People's Republic of China	-2.201*	0.028	-2.201*	0.028	-0.943	0.345
Garlic (fresh/chilled)	-2.605**	0.009	-2.480*	0.013	-3.296**	0.001
India	-1.604	0.109	-1.604	0.109	-1.604	0.109
People's Republic of China	-2.201*	0.028	-2.20*1	0.028	-2.201*	0.028

[a/] Quantity in number of live poultry, domestic fowls, ducks, geese, etc.
* significant at α= 5%
** significant at α=1%

between the Philippine imports and the exports of the exporting countries (Table 9). This implies that although some inconsistencies in the recorded quantities do exist, the difference does not significantly affect the reliability of the partner- country statistics in this category. In terms of the aggregate FOB values, however, analysis shows that the differences between the reported import and export data do exist and are significant in the years 2001 and 2005. Also, the differences in the average of the derived unit prices are all statistically significant (Table 9).

The test results further reveal that the reliability of partner-country statistics increases only if annual totals are considered. The analysis by year could indicate the accuracy of the partner-country data on foreign trade at an aggregate level, especially for traded quantity.

The Wilcoxon-MPSR test is likewise applied to total FOB values, total traded quantity, and derived unit price for all the commodities under study, by exporting country (Table 10). Significant differences are noted in 8 (28 percent) of the 29 exporting countries for FOB values; 4 (14 percent) of the total for the traded quantity; and 12 (41 percent) of the total for the derived unit prices. These could be attributed to the conceptual differences between the Philippine imports and the exports of the exporting countries, which include the following: trade system, the timing of recording, entrepõt trade, partner- country attribution, and the threshold value or the minimum value included in the compilation of trade statistics.

SUMMARY AND CONCLUSIONS

This study confirmed the discrepancy between the reported Philippine import data and their counterpart export data filed by the exporting countries. Differences in reported FOB values ranged from a low of -79.7 percent for garlic in 2004 to a high of 67.9 percent in the case of live poultry. For traded quantity in kilograms, the differences ranged from a low of -93.7 percent for corn to a high of 379.3 percent for oranges, both in 2005. These variations were attributed to differences in the trade system used, the timing of recording, entrepõt trade, partner- country attribution, and the threshold value or the minimum value included in the compilation of trade statistics. The possibility of under-reporting imports as importers attempt to evade tariffs, or over-reporting exports due to export subsidies could have likewise caused the said discrepancies between the reported figures of Philippine imports and the exports of the exporting countries.

Table 9. Wilcoxon-MPSR test statistics across commodities, by year.

Year	FOB Values		Quantity (Gross Kilograms)		Derived Unit Price (in US$)	
	Z-value	P-Value	*Z*-value	P-Value	*Z*-value	P-Value
Overall	***-4.764****	***0.000***	***-1.244***	***0.214***	***-8.893****	***0.000***
2000	-1.849	0.064	-1.173	0.241	-3.526**	0.000
2001	-3.134**	0.002	-1.465	0.143	-3.499**	0.000
2002	-1.181	0.238	-0.159	0.873	-3.562**	0.000
2003	-0.801	0.423	-0.647	0.518	-4.094**	0.000
2004	-1.641	0.101	-0.005	0.996	-3.755**	0.000
2005	-2.872**	0.004	-0.650	0.516	-3.360**	0.001

* significant at α= 5%
** significant at α=1%

Table 10. Wilcoxon-MPSR test statistics across commodities, by exporting country, 2000-2005.

Exporting Country	FOB Values (in US $)		Quantity		Derived Unit Price (in US$)	
	Z-value	P-Value	*Z*-value	P-Value	*Z*-value	P-Value
Overall	**-4.764****	**0.000**	**-1.244**	**0.214**	**-8.893****	**0.000**
Argentina	-2.100*	0.036	-1.540	0.123	0.000	1.000
Australia	-0.414	0.679	-1.677	0.094	-3.462**	0.001
Brazil	-2.547*	0.011	-1.362	0.173	-2.310*	0.021
Canada	-0.103	0.918	-0.569	0.569	-1.293	0.196
Chile	-1.826	0.068	-1.826	0.068	-1.826	0.068
People's Republic of China	-3.457**	0.001	-3.154**	0.002	-3.189**	0.001
Denmark	-0.447	0.655	-1.342	0.180	-1.000	0.317
France	-2.366*	0.018	-1.859	0.063	-1.521	0.128
Germany	-2.240*	0.025	-0.140	0.889	-1.960*	0.050
Hongkong	-2.352*	0.019	-0.560	0.575	-3.173**	0.002
India	-0.487	0.626	-1.004	0.315	-0.548	0.584
Indonesia	-0.533	0.594	-0.622	0.534	-0.267	0.790
Japan	-0.078	0.937	-2.275*	0.023	-3.059**	0.002
Republic of Korea	-0.944	0.345	-0.135	0.893	-2.023*	0.043
Malaysia	-0.267	0.790	-0.711	0.477	-1.067	0.286
Netherlands	-1.136	0.256	-1.988*	0.047	-0.909	0.363
New Zealand	-2.542*	0.011	-1.922	0.055	-3.233**	0.001
Republic of Pakistan	-1.120	0.263	-1.183	0.237	-2.521*	0.012
Singapore	-1.590	0.112	-1.761	0.078	-2.385*	0.017
Republic of South Africa	-0.140	0.889	-0.169	0.866	-1.540	0.123
Switzerland	-0.447	0.655	-1.342	0.180	-1.342	0.180
Thailand	-0.182	0.855	-0.091	0.927	-0.081	0.935
United Kingdom	-0.734	0.463	-1.363	0.173	-2.201*	0.028
USA	-2.519*	0.012	-1.228	0.220	-2.900**	0.004
Vietnam	-1.820	0.069	-2.240*	0.025	-1.680	0.093

* significant at α= 5%

** significant at α=1%.

Significant improvement in the percentage differences was noted for all the commodities under study when the implicit minimal measurement error (IMME) was used. However, most of them remained above 10 percent, indicating that trade-partner data were still unreliable.

The Wilcoxon-MPSR test revealed that such data differences were significant. This is particularly true for the FOB values of Philippine imports of onions, garlic, and apples, as compared with the counterpart data of the exporting countries. The same held true for data differences in trade quantities of these commodities, except for apples where non-significance was noted.

Based on these results, one could conclude that considerable discrepancies between import and export statistics do exist and that the differences are significant. It does not mean, however, that the two data series (imports and exports) are incorrect; establishing which data are more reliable will be difficult.

Many studies (e.g., Yeats 1995) believe that the reported data on imports are considered to be of better quality since import documentation

is normally more complete than export documentation. This, in turn, is due to the duties, taxes, and other regulatory controls applied to imports, which provide Customs authorities greater incentives to monitor them. However, the possibility of under-reporting of imports to evade high tariff duties cannot be ignored, as evident in the differences in the derived unit prices of the commodities.

RECOMMENDATIONS

The source of uncertainty in trade data is linked to discrepancies in bilateral-commodity trade data. These discrepancies somehow make country totals "unreliable" and may lessen the integrity of the trade structure. Although the findings show that the disparity between the Philippine import data and the exports of the exporting countries is attributable more to legitimate conceptual differences, data reconciliation with trading partner may be conducted to determine and quantify which factors really cause the said discrepancies. This can help explain the discrepancy between the import and export statistics of trading partners and at the same time aid partner countries to better understand bilateral trade flows. However, the reconciled data do not represent changes to the officially published trade figures because reconciliation adjustments normally include a series of estimates that are not sufficiently precise to permit modification of officially published data.

For example, many countries' import data are valued at CIF prices that include insurance and freight charges, which in, turn must be removed during reconciliation since the partner country's exports are usually valued on FOB basis. In addition, estimates of insurance and freight charges are usually derived indirectly and do not necessarily reflect their true amount. Because of this, the results of the reconciliation could only help improve the understanding of the trade statistics of the countries involved, as well as, serve as basis for recommending possible changes in the definitions and data compilation procedure, which in turn might improve the overall quality of foreign trade data.

The reconciliation measures include, for example, the harmonization of the commodity codes and the use of appropriate quantity units that could result in a more comparable data, or the development of an appropriate conversion factor to standardize the units of quantity. These procedures may help harmonize the conceptual framework of the two sets of statistics, thereby leading to the revision of certain procedures and definitions, and in some cases, the use of alternative data sources. The reconciliation exercise could likewise help foster a common perception of the trade flow; thus, can facilitate the development of bilateral economic negotiations and international cooperation.

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