INDONESIAN EGGS ARE PRICIER THAN THOSE IN AUSTRALIA

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Abstract

In measuring a nation's wealth, we can observe from how much purchasing power its citizens have. The more things they can buy with the same value of money, the wealthier the nation is. This paper will examine the purchasing power of Indonesian citizens in buying one of their essential staples; egg. We will take a look at those having minimum wage, whether they need a higher value of money in order to purchase one kilograms of egg. To understand how powerful the purchasing power is, we will compare with Australian citizens having the minimum wage, as well. The distinction part of this paper, is that we take into account OECD's Purchasing Power conversion rate, instead of using currency rate. After examining both samples, we obtain that people in Indonesia have lower purchasing power than those in Australia.

Keywords: OECD, Purchasing Power Parity Conversion Rate, Purchasing Power, Egg, Minimum Wage, Indonesia, Australia

1. Introduction

Indonesians consumed around 1.5 million tons of eggs in 2018 [1]. Having 267.7 million people, Indonesians consumed eggs at an average of 5.6 kg. It is equivalent to consuming 1 egg every four days. Though it seems a minimal contribution to daily protein intake, keeping up with the demands is not an easy task. Indonesians still need the egg to fulfill daily protein intake -- 55grams of daily protein standard [2], [3]. This means that providing sufficient supply for Indonesians is a massive plan.

As in Australia, they enjoyed 249 eggs per capita annually [19]. People can easily access eggs from nearby supermarkets. In total, Australians consume 17,3 millions of eggs. Taking into account 25,69 million Australians [7], on average, they consume more eggs than Indonesians. But, the question is, whether it is truly cheaper in Australia to purchase eggs?

People in Indonesia typically prefer eggs to other sources of animal protein, namely lamb, chicken or beef. It is presumably, they chose eggs for their affordability. Even more, it is more practical and quicker to process to become a meal, compared to other animal protein options. Although, egg ranks last in the amount of protein it contains; only 13 grams per 100grams of egg [5]. This is the least, from 24.8 grams in lamb [6], 25,4 grams in beef and 27 grams in chicken. Nevertheless, its practicality and affordability ranks up in Indonesia's staple food

There are two units in purchasing eggs in Indonesia, compared to one unit of purchase in Australia; in dozens. Some part of Indonesia use kilogram units, while some others uses piece units. From Table 4, we can see that the price varies from IDR 21,438 (AUD$ 2.18) to IDR 33,842 (AUD$ 3.46) per kilogram. We can get the cheapest price in Jawa Tengah, and the most expensive is in Papua. While in Australia, as in Table 2, the price found was lacking in deviation. The most expensive price is in Melbourne (AUD 7) and the cheapest is in Toowoomba and Cairns (AUD 4).

At a glance, in Indonesia, even spending AUD4 will get us a kilogram (roughly 16-17 eggs), while the same amount of money will only give us a dozen (12 eggs) in Australia. Although it seems that eggs are cheaper in Indonesia, we remain curious of the hypothesis and very keen to understand this matter.

Both countries produce more than they consume. As in Indonesia, they produce 1.72 million tons [1] while Australian farmers produce 525 million of egg [19]. Both of them exceed the current national demand for eggs.

Since citizens from both countries consume egg, we want to examine their wealth by examining their purchasing power. Since there are wealthier people who do not put price as one of their purchasing decisions, there is also a segment within the people whose purchasing power is determined by the price of the egg. This segment of people we want to examine are those individuals who earn minimum wage. This is the approach we want to take; by examining how valuable eggs are to them. Minimum wage is the amount of salary they earn such that they can support their life at the minimum level [8]. Their decision whether to consume or purchase eggs, will depend on the price of the egg. [9],[10]. As for the minimum wage data, we shall derive from [11] and [12]. Throughout this paper, we will refer

to the word “people” as “individuals who earn minimum wage in their respective countries.”

In comparing the purchasing power between the two countries, we use the concept "The Law of One Price". Simply saying, eggs in Indonesia and Australia are of similar goods. Similar goods, in this law, should have the same value (worth of money), regardless of the location.

In Table 5 and Table 6, we can easily see that the price of eggs varies among cities and regions. The price is also different in currency. The question of how to compare the value of a good between the two countries is intriguing.

The first idea that we commonly encounter, is the suggestion to directly compare the prices using the exchange rate in the global currency market. This idea has two weaknesses.

1. By using the exchange rate in the global currency market, the prices do not reflect the value of the money in each country. For example, IDR 1.000.000 (AUD103) in Indonesia may be worth quite a bit, but it may not be worth that much in Australia.
2. People purchase locally and earn locally. AUD 800 (IDR 7,8 million) per week in Australia may not be worth much, but the same amount of money is almost 3 times as much of Indonesia’s average monthly salary. The data will be provided in the section below.

We want to confirm whether people from both countries have the similar purchasing power, from The Law of One Price concept. The importance of this confirmation, whichever people move to another country, they can feel sufficient in their life with their earnings.

2. Literature Study

Purchasing power parity is a theory that explains movements in the exchange rate between two countries’ currencies by changes in the countries’ price level[23]. It states that the exchange rate between two countries is equal to the ratio of the two countries’ price level. It compliments “The Law of One Price” that identical goods in two different countries must sell at the same price, assuming that the market is competitive, free of transportation costs, and doesn’t have barriers to trade such as tariffs.

Similar studies employing the concept of Purchasing Power Parity in examining the value of goods between two countries are not commonly found, specifically in examining egg price between Indonesia and Australia. Previously, [15] examined the cost of egg production in 15 countries, but Indonesia was not included in the study.

In making comparisons, we employ the z-test of means [18]. This simple technique is commonly used by most people, as it is available in Microsoft Excel’s Data Analysis ToolPak. It is as simple as providing both data in two different tables, determine each data’s variance, and then run the analysis. The result came in the form of a Z-test result, and we need only to understand the meaning of the result. The result was mainly about whether we reject the null hypothesis or not. If we reject the null hypothesis, it implies that the hypothesis we propose is very unlikely to be true. on the other hand, if we don’t reject the null hypothesis, we may conclude that our hypothesis is very likely to be true.

Similarly, in [16], they examined the importance of egg supply, and made comparisons between developed countries and developing countries. Indonesia was not specified in the study either. However, they explained that Indonesia is among countries whose egg availability is among the lowest that in other countries.

3. Research Method

In this paper, prior to examining the hypothesis, we need to understand the following data. We collect data from public available data.

1. PPP Conversion ratio AUD-IDR in 2021.
2. Egg price in Australia in 2021, in AUD and dozens units.
3. Egg price in Australia, converted using PPP conversion ratio, in kg units. Assign to variable x_1
4. Egg price in Indonesia in 2021, in IDR and kg units. Assign to variable x_2
5. Minimum Wage in Indonesia,
6. Minimum Wage in Australia

The we set up the data in the following tables

Table 1, PPP Conversion rates for USD-IDR [17]

AUD / USA	1.439
IDR / USA	4,758.701
AUD / IDR	3,306.95

Table 2, Egg prices, in 30 most populous cities, 2022. [20]

City	**Retail Price (per dozen/ 12 pcs) in AUD**
Sydney	4.92
Melbourne	7

City	Retail Price (per dozen/ 12 pcs) in AUD
Brisbane	5
Perth	4.5
Adelaide	5
Gold Coast – Tweed Heads	5
Newcastle – Maitland	6
Canberra – Queanbeyan	6
Sunshine Coast	5
Central Coast	8
Wollongong	4
Geelong	4
Hobart	4
Townsville	2
Cairns	2
Toowoomba	2
Ballarat	5
Bendigo	5
Albury – Wodonga	5
Launceston	6
Melton	4
Bunbury	5
Coffs Harbour	5
Bundaberg	5
Wagga Wagga	5
Hervey Bay	5
Shepparton – Mooroopna	4
Mildura – Wentworth	4
Port Macquarie	5
Gladstone – Tannum Sands	5

Table 3 Egg prices, in 30 most populous cities, 2022, converted, in kilogram

City	Retail egg price, converted, kg, in IDR
Sydney	23,049.44
Melbourne	32,793.92
Brisbane	23,424.23
Perth	21,081.81
Adelaide SA	23,424.23
Gold Coast – Tweed Heads	23,424.23
Newcastle – Maitland	28,109.07
Canberra – Queanbeyan	28,109.07
Sunshine Coast	23,424.23
Central Coast	37,478.77
Wollongong	18,739.38
Geelong	18,739.38
Hobart Tas	18,739.38
Townsville	9,369.69
Cairns	9,369.69
Toowoomba	9,369.69
Ballarat	23,424.23
Bendigo	23,424.23
Albury – Wodonga	23,424.23
Launceston Tas	28,109.07
Melton	18,739.38
Bunbury	23,424.23
Coffs Harbour	23,424.23
Bundaberg	23,424.23
Wagga Wagga	23,424.23
Hervey Bay	23,424.23
Shepparton – Mooroopna	18,739.38
Mildura – Wentworth	18,739.38

City	Retail egg price, converted, kg, in IDR
Port Macquarie	23,424.23
Gladstone – Tannum Sands	23,424.23

Table 4. Egg price data in Indonesia in 2022, in kilograms [19]

Province	Retail Egg Price
Aceh	Rp25,538
Sumatera Utara	Rp24,492
Sumatera Barat	Rp24,875
Riau	Rp24,196
Kepulauan Riau	Rp23,267
Jambi	Rp24,896
Bengkulu	Rp21,875
Sumatera Selatan	Rp23,954
Kepulauan Bangka Belitung	Rp22,604
Lampung	Rp25,583
Banten	Rp22,775
Jawa Barat	Rp22,550
Dki Jakarta	Rp22,688
Jawa Tengah	Rp22,963
Di Yogyakarta	Rp21,571
Jawa Timur	Rp21,975
Bali	Rp21,438
Nusa Tenggara Barat	Rp22,950
Nusa Tenggara Timur	Rp24,500
Kalimantan Barat	Rp28,108
Kalimantan Selatan	Rp27,825
Kalimantan Tengah	Rp24,429
Kalimantan Timur	Rp27,917
Kalimantan Utara	Rp25,108
Gorontalo	Rp28,400
Sulawesi Selatan	Rp29,525
Sulawesi Tenggara	Rp21,333
Sulawesi Tengah	Rp24,825
Sulawesi Utara	Rp25,625
Sulawesi Barat	Rp25,321
Maluku	Rp20,875
Maluku Utara	Rp30,858
Papua	Rp33,842

Table 5, Minimum wage in, Indonesia, 2021 [11]

Province	Average of Minimum Wage Tahun 2022 (in IDR)
Aceh	3,173,353.48
Bali	2,642,551.56
Banten	3,847,081.13
Bengkulu	2,293,511.20
Gorontalo	2,800,580.00
Jakarta	4,641,854.00
Jambi	2,700,167.00
Jawa Barat	3,072,179.44
Jawa Tengah	2,056,107.11
Jawa Timur	2,502,929.87
Kalimantan Barat	2,580,799.14
Kalimantan Selatan	2,932,734.62
Kalimantan Tengah	3,086,249.71
Kalimantan Timur	3,232,989.70
Kalimantan Utara	3,273,628.80
Kepulauan Bangka Belitung	3,264,884.00
Kepulauan Riau	3,418,735.71
Lampung	2,517,771.73
Maluku	2,623,563.36
Maluku Utara	2,866,007.90
Nusa Tenggara Barat	2,250,520.30
Nusa Tenggara Timur	1,977,931.82
Papua	3,561,932.00
Papua Barat	3,200,000.00
Riau	3,098,521.83
Sulawesi Barat	2,743,978.67

Province	**Average of Minimum Wage Tahun 2022 (in IDR)**
Sulawesi Selatan	3,176,823.58
Sulawesi Tengah	2,566,186.85
Sulawesi Tenggara	2,730,138.82
Sulawesi Utara	3,316,307.40
Sumatera Barat	2,512,539.00
Sumatera Selatan	3,173,623.59
Sumatera Utara	2,735,643.76
Yogyakarta	1,975,218.60
Average of Minimum Wage in Indonesia	**2,831,246.89**

Table 6, Minimum wage in Australia [12]

Australia	AUD$21.38 per hour or $812.60 per 38-hour week Equivalent to AUD 3249.76 per month

Now that we have completed all the data above, we need to set up a hypothesis. In this paper, we hypothesize that the value of a kilogram of egg in Australia is the same as the value of those in Indonesia. We will approach this statement by examining the average egg price in Australia is of equivalent value to those in Indonesia. We will use data in Table 3 as variable X1 and in Table 4 as variable X2. We then setup the hypothesis as follows:

Hypotheses: (assume $\alpha = 0.05$)

$$H_0: \mu_1 = \mu_2$$
$$H_1: \mu_1 < \mu_2$$

Using Z-test: two sample for means, we obtain the following results:

Table 7, Z-test result

	X1	X2
Mean	22,240.52	24,808.46
Known Variance	35,828,756.93	8,764,428.69
Observations	30	33
Hypothesized Mean Difference	0	
z	-2.125	
P(Z<=z) one-tail	0.01677975	
z Critical one-tail	1.64	

Since z is less than z Critical one-tail (-2.125<-1.64) we can reject the null hypothesis. Thus, we accept the alternate hypothesis, that the average egg price in Australia cost less than those in Indonesia.

4. Discussion

From the analysis in Table 7, we obtain the result that the average egg price in Australia is less than those in Indonesia. This implies that, on average, it costs less for Australians to purchase the same amount of egg than their colleague in Indonesia.

Some may argue that it is due to Australians having more income than Indonesia. This is not particularly correct, but we will discuss it further in the next paragraphs. We can argue these statements, since the analysis and approach did not include comparing the amount of minimum salary from both countries. The analysis was simply using the average egg price from both countries and converting it using the PPP conversion rate. We simply want to examine the value of the egg from each country, and the result showed that Indonesians need to spend more value of money to purchase the same amount of egg than people in Australia. This also explains why the amount of egg consumption per capita in Indonesia is way less than in Australia.

The findings may suggest two approach to equalize the purchasing power between two countries.;

- That Indonesia should have an option of lower price egg, or
- That Indonesia should raise the minimum wage level.

In the first approach, should we try to lower egg prices in Indonesia, how much would it be? We apply PPP conversion rate in Table 1 and multiply it to the average egg price of Australia from Table 2, we obtain AUD 4.75 x 3306,95 = IDR 15708.01, equivalent to 22,240.52 (Table 7). It remains to be investigated whether this target price is achievable throughout Indonesia, since its archipelagic characteristic results in additional logistic cost to deliver to the customers.

As for the second approach, we may do it by setting up the amount of minimum wage in each country equal to each other using the purchasing power parity conversion rate. Suppose we take Australia's minimum wage, as in Table 7, AUD 3249.76 per month. Then, we multiply it by the conversion rate in Table 1, 3306,95, we obtain IDR 10,746,793.72. This number implies that in order for Indonesian people to have the equal level of purchasing power as Australians, they need to earn IDR 10,746,793.72 per month.

On the other hand, suppose we take the average minimum wage in Indonesia (Table 6), say IDR 2,831,246.89. If we divide it using the conversion rate in Table 1, 3306,95, we obtain 856.15. This number implies that the average minimum wage in Indonesia is only worth AUD 856, 15. Suppose that we show this

number to Australians, they will be very reluctant to do the job complying with Indonesia's minimum wage.

This amount is larger than the findings of [22], suggesting that Indonesians need to earn approximately IDR 6.000.000 per month to consume the same level of purchasing power as in the US. These are interesting findings, and may be examined in another article.

5. Conclusion

Using Purchasing Power Parity conversion rate in investigating the purchasing power of a particular goods between two countries has been a practical tool. As in this paper, we have shown you that Indonesians pay more value for money to consume the same amount of egg, rather than Australians. This finding does not involve facts about the level of minimum wage in both countries, but it can give suggestions on how much minimum wage that Indonesians need to earn in order to have the purchasing ability as much as Australians.

This paper may suggest a few further discussion, such as whether it is possible to lower egg prices

We have found out that, on average, it costs less to purchase eggs in the US than in Indonesia. Using the PPP conversion ratio to compare egg prices from both countries can be valuable and fair. Although egg prices in Indonesia seem to be less than in the US, it costs more to Indonesians to purchase the same amount of eggs than in the US. Consequently, Indonesians can purchase less than US citizens using the exact value of money. It implies that Indonesians may consume fewer eggs, therefore lessening their daily protein intake than US citizens.
In this study, in order to enable Indonesians to purchase eggs at the same value as in the US, we can use PPP conversion rates to suggest the level of minimum wage that matches US minimum wage. Society can benefit from this, that is Indonesians have the same purchasing power as Americans.
By multiplying US minimum wage, as in Table 5, and PPP Conversion Rate, we obtain
USD 1.256 x 4.759,089
= IDR 5,977,415.78 ~ IDR 6 Million

From the above calculation, we have seen that obtaining the same purchasing power as Americans suggests that Indonesians' minimum wage is as low as IDR 6 Million. Our current minimum wage is insufficient to afford similar purchasing power as Americans.

It is important for the Indonesian government to enable their citizens to consume more eggs to reach basic daily protein intake. This can be in the form of the following

- reducing the price of eggs, or
- raising the minimum wage, or

Establishing the poverty-income threshold. A threshold to categorize people,whether they are poor or not, based on their yearly income.

All options will yield another problem and challenges. Reducing egg price will lead to company and supply chain efficiency. Raising the minimum wage will challenge job availability, thus threatening investment and poverty level, also macroeconomics situations. While the third option can bring a novel alternative to the current definition of poor households. We believe that the definition of low-income or poor household is not practical and measurable. Should we be able to introduce a poverty-income threshold, we believe that we can identify poor households easier and thus the government can swiftly provide support for those households.

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