

The effect of pricing level to the loss of welfare costs (case study: Indonesia region II water company)

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Abstract. Climate change makes the water balance composition being unstable, both quality and quantity. As a company which responsible for water management, Regional Drinking Water Company (abbreviated as PDAM) is often unable to solve the problem. Welfare costs are indicators to evaluate the economic efficiency. This study aims to calculate the welfare cost of the people lost due to the price determination of PDAM Indonesia in region II with deadweight loss (DWL) approach, so it can provide information to pricing regulator, pricing decision makers and for coIDRorate management. DWL is a loss of economic efficiency that can occur when equilibrium for a good or a service is not achieved, caused by monopoly pricing of artificial scarcity, an externality, a tax or subsidy, or a binding price ceiling or price floor such as a minimum wage. Results showed that the pricing rules set by PDAM yielded different DWL, depending on margin set by the company DWL PDAM ranges between IDR 260,485.66/M³ to IDR 127,486,709.86/M³ which is actually shared to improve the welfare of customers, other communities, and PDAM itself. Data analysis used PDAM performance in 2015 that have not Good CoIDRorate Governance Management and Efficiency.

1. Introduction

The 1945 Constitution of article 33, paragraph 3 explains that the earth, water, and all the natural wealth contained therein are controlled by the State and should be fully utilized for the welfare of the society. Based on the regulation, the water resources management reference is fully controlled by the government. Its concern is to emphasize that all water resources can be maximally supervised and equally profit-sharing to society.

Climate change generates the water balance composition being imbalanced, both quality and quantity [1]. Water is a basic human necessity, so it is a very profitable business, almost 99% of the world's population needs water. The government becomes a decision maker to solve this problem by establishing a Local Water Company (abbreviated as PDAM) in every region to reach all the people's needs. It has large market potentials but based on data by 2010, Indonesian which using its facilities as drinking water were only 14%, and by 20% for clean water purposes [2]. It's minor product utilization because is still bad and not ready for consumption. It should be able to contribute needs which is ready to be consumed and processed or at least clean, but in reality, there are still many enterprises whose its quality is below the clean water standard. Its production which has not maximized, due to the public confidence level to eat up becomes low.

PDAMs have spent a lot of money for water sources, reservoirs, treatment, pipelines, and distribution. The funds are purely from local or governmental finances, as well as foreign debt or aid. The companies have high debt trends and low production cost efficiency [3]. It is caused by the



number of consumer requests who are still small, so it cannot cover production costs incurred by the corporation. The small number of requests in addition to the low level of public confidence to this firm, as well as it is located in every city or district, while the number of people in those locations is different. Regions that have more communities are more likely to be those clients than others who do not have. Its supply capability differences and the public demand potential for water cause different tariffs. It has high production costs and a low number prospects will have a high rate as well. The price escalation can cause a loss of people's welfare, as they have to lose more money to meet water needs. It can be measured by the Dead Weight Loss (DWL) approach, i.e. the loss of economic efficiency in monetary measure if the applied cost to the public is not in accordance with the marginal price.

The government as the holder of PDAM price regulator should know the economic factors, including the water price elasticity, in order to determine the balanced price. Its performance in 2015 portrayed that 368 companies in Indonesia, only 53% had healthy indicators, 27% were less healthy, and 20% were sick, one of the main factor, due to its high and inefficient production costs and high margin requirements [4], which was provoking a DWL value roses up.

The purpose of this paper is to analyze the economic welfare of the people who are lost due to the increase of water supply tariff in PDAM region II Indonesia, which includes the sick PDAM. This analysis approach was performed by calculations from DWL with different levels of demand elasticity assumptions. It employed the demand levels assumptions from different price levels.

2. Methodology

The method which exploited to determine the lost welfare was by calculating deadweight loss approach. It was employed by different approaches to the demand elasticity. The calculation formula of deadweight loss from several companies in the same year is [5]:

$$DWLi = \frac{(|Q1-Qo|*|P-MC|)}{2} \tag{1}$$

Where Q1 is the predicted amount of consumed water when the price is equal to MC, Qo is the amount of consumed water at the current price (P * Qo). From equation (Q1-Qo) can be calculated by the formula:

$$\Delta Q = \frac{(MC-P)}{P} * \epsilon * Qo \tag{2}$$

Where ϵ is the level of demand elasticity. Its water demand has not accomplished by many researchers, therefore in this study operating by different elasticity levels were 0.2, 0.5, and 0.8.

3. Sample data

Observations were conducted by utilizing PDAM data in Indonesia Region II that have the less healthy condition. Data was taken from the performance of 12 diseases in 2015 [6]. It was picked up from the annual report by 2015 which was created by Development Agency of Development of Drinking Water Supply System to see how much loss of society welfare level.

The marginal data of PDAM disease in region II shows a price difference variation between tariff and marginal price ranged between IDR 64.50/m³ up to IDR 693/m³. This margin was high enough, therefore the losing welfare chances became great. As an example of Table 1 above that if Kediri's applied marginal rates to the tariff, then public consumption of PDAM water production will increase from 2,587,769.00 m³ to 2,943,020.40 m³, 417,020.40 m³ of increasing amount. The predicted climb was quite large, it shows how much the people lost welfare.

4. Result

The results of this study will examine the marginal differences and tariff margins which were employed by PDAMs to change the water consumption demand of public water companies with different elasticity approach to bridge all possible conditions, i.e. -0.2, -0.5, and -0.8 of elasticity. This analysis will look at how enterprises have lower tariffs than marginal prices and it have higher tariff than marginal prices, with all consumers record who are already their clients.

Table 1. Data on profit, initial consumption, predicted consumption, and deadweight loss from 0.8 elasticity.

Performance of PDAM Indonesia region II					
No	Region	Margin	Water consumption	Predicted water consumption	Deadweight loss
		(IDR/m ³)	(m ³)	(m ³)	(IDR)
1	Sukabumi City	173.81	3,793,069.00	3,900,387.67	9,326,666.08
2	Banjar City	693.00	2,534,611.43	2,872,072.67	116,930,317.51
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7	Blitar District	671.12	2,559,640.00	2,939,561.28	127,486,709.86
8	Kediri District	472.20	2,526,000.00	2,943,020.40	98,459,077.55
9	Pamekasan District	64.50	2,587,769.00	2,620,078.48	1,041,942.62
10	Lamongan District	439.03	3,871,066.00	4,206,684.93	73,672,848.50
11	Blitar City	381.23	88,258.00	97,639.44	1,788,262.42
12	Ponorogo District	109.19	2,963,620.00	3,055,569.92	5,020,011.14
Average		347.83	2,550,820.94	2,747,236.58	47,343,076.55

Source: Annual report elaboration of PDAM performance in 2015.

This calculation analysis can also be used to compare PDAM, for example, PDAM Blitar and Pamekasan Regencies cooperation. Both businesses have the same 2,500,000 m³ of gross water consumption, but PDAM Blitar margin was very high at IDR 671.12/m³, while Pamekasan Regency has a low margin of IDR 64.50/m³. Huge gap difference made Blitar district firm lost more prosperity than Pamekasan regency, so Blitar deadweight loss was bigger than Pamekasan district.

Table 2. The total deadweight loss in the different level of elasticities.

Performance of PDAM Indonesia region II					
No	Region	DWL			
		-0.2	-0.5	-0.8	
		(IDR/M3)			
1	Sukabumi City	2,331,666.52	5,829,166.30	9,326,666.08	
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Average		11,835,769.14	29,589,422.85	47,343,076.55	

Table 3 displays the deadweight loss overall number from different levels of elasticity. Sukabumi city at elasticity 0.2, has IDR 2,331,666.52 of deadweight loss and at elasticity 0.8 was IDR 9,326,666.08 which exactly 4 times bigger. The total deadweight loss was IDR 11,835,769.14 to IDR 47,343,076.55 with the highest deadweight loss was Blitar district. Based on table 3, it can be seen that in an average of PDAM wasted welfare value with IDR 260,485.66 to IDR 127,486,709.86 of deadweight loss approach level.

The Results portrayed that a low-level efficiency, there was expected the government role to improve PDAM performance. By developing, companies expected performance can help by solving uneven water necessary due to the climate change impact.

5. Discussion and policy implications

The regulation of tariff formation of PDAM water supply should be taken seriously by the government because, according to the 1945 Act, water is the natural resource which becomes state responsibility and to fulfill the people's welfare. The first policy that must be accomplished by the government is to control the productivity and working pattern of the companies, in order to produce water production quality to increase customer trust in PDAM therefore, people hope who has not yet become PDAM members, will join later. The second policy that must be done was to control the price tag, so the prevailing tariff was a reasonable amount and in accordance with the ability, level to pay the community. Welfare loss can be seen from the deadweight loss value, if it can be managed properly, it can be utilized to improve the customer's welfare themselves, other communities, and the company itself. By improving its performance, it can solve and manage uneven water necessary due to the climate change impact

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By improving PDAM performance, it can solve and manage uneven water necessary due to the climate change impact. Loss welfare analysis with deadweight loss approach indicates that freedom of price tag determination by each company without central government control would cause price level variation. Low or negative margin prices have a positive impact on society as their welfare rises, however, for enterprises would experience continuous and welfare losses, while those high margins will cause massive losses to society and greater deadweight loss. This paper wishes to show the firms with the same amount of public consumption, rate, and margins have unequal characteristics and need further research on conduct and performance.

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by Evi Gravitiani

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4.2

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : **PROSIDING** *

Judul Karya Ilmiah (paper) : The Effect of Pricing Level to the Loss of Welfare Costs (Case Study: Indonesia Region II Water Company)

Jumlah Penulis : 4 Orang (B Rosalina EWK, Evi Gravitiani, Mugi Rahardjo, Tri Mulyaningsih)

Status Pengusul : ~~Penulis pertama~~ / penulis ke 2 / ~~penulis korespondensi**~~

Identitas Prosiding :

- a. Nama Prosiding : **International Conference on Climate Change 2017**
- b. ISBN/ISSN : -
- c. Tahun Terbit, Tempat Pelaksanaan : **Solo, 24 - 26 Oktober 2017**
- d. Penerbit/organiser : **IOP Publishing**
- e. Alamat repository PT/web : https://drive.google.com/file/d/12TSE5-NwUjocFxlSPShN7ag8_EO0Szay/view
- f. Terindeks di (jika ada) : **Scopus**

Kategori Publikasi Makalah : Prosiding Forum Ilmiah Internasional
(beri ✓ pada kategori yang tepat) Prosiding Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding 15		Nilai Akhir Yang Diperoleh
	Internasional <input type="checkbox"/>	Nasional <input type="checkbox"/>	
a. Kelengkapan unsur isi paper (10%)	3		3
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		7
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		7
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9		9
Total = (100%)	30		26
Nilai Pengusul = (40% x 26) / 3 = 3.47 (Penulis Kedua)			

Catatan Penilaian artikel oleh Reviewer :

a. Kelengkapan dan kesesuaian unsur isi artikel :

Prosiding ini sudah menggunakan pola penulisan yang diacu oleh panitia yaitu introduction, method, result, discusssion dan conclusion. Artikel yang ditulis sesuai antara judul dengan isi dan sistematikanya

b. Ruang lingkup dan kedalaman pembahasan :

Artikel ini membahas tentang pricing level untuk PDAM yang sudah cukup banyak dibahas, namun sangat dibutuhkan untuk penentuan level harga untuk barang yang dibutuhkan masyarakat yaitu air. Pembahasan dalam artikel ini kurang dalam mungkin karena pembatasan jumlah artikel, sehingga table hasil pengolahan tidak bisa dibahas secara lebih detail

c. Kecukupan dan pemutakhiran data/informasi dan metodologi :

Data dalam artikel ini adalah sekunder dengan alat analisis yang relative simple , masih banyak bahan / data yang bisa diolah secara lebih detail namun belum dimasukkan dalam artikel ini

d. Kelengkapan unsur dan kualitas terbitan :

Artikel ini diterbitkan dalam proceeding yang terindeks scopus IOP sehingga secara kualitas cukup bagus

e. Indikasi Plagiat :

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f. Kesesuaian bidang ilmu :

g. Artikel ini sesuai dengan bidang ilmu penulis yaitu ekonomi pembangunan

Surakarta, 9 Desember 2020

Reviewer ^{1/2} **

Dr. Izza Mafruhah, SE, M.Si

NIP 197203232002122001

Jabatan : Lektor Kepala

Pangkat, Gol Ruang : IV/b

Unit Kerja : FEB

Bidang Ilmu : Ekonomi Pembangunan

*Dinilai oleh dua Reviewer secara terpisah

**Coret yang tidak perlu

4.7

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : **PROSIDING** *

Judul Karya Ilmiah (paper) : The Effect of Pricing Level to the Loss of Welfare Costs (Case Study: Indonesia Region II Water Company)

Jumlah Penulis : 4 Orang (B Rosalina EWK, Evi Gravitaniani, Mugi Rahardjo, Tri Mulyaningsih)

Status Pengusul : ~~Penulis pertama~~ / penulis ke 2 / ~~penulis korespondensi**~~

Identitas Prosiding :

- a. Nama Prosiding : **International Conference on Climate Change 2017**
- b. ISBN/ISSN : -
- c. Tahun Terbit, Tempat Pelaksanaan : **Solo, 24 - 26 Oktober 2017**
- d. Penerbit/organiser : **IOP Publishing**
- e. Alamat repository PT/web prosiding : https://drive.google.com/file/d/12TSE5-NwUjocFx1sPShN7ag8_EOOSzay/view
- f. Terindeks di (jika ada) :

Kategori Publikasi Makalah : Prosiding Forum Ilmiah Internasional
(beri ~ pada kategori yang tepat) Prosiding Forum Ilmiah Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Prosiding 15		Nilai Akhir Yang Diperoleh
	Internasional <input type="checkbox"/>	Nasional <input type="checkbox"/>	
a. Kelengkapan unsur isi paper (10%)	1.5		1
b. Ruang lingkup dan kedalaman pembahasan (30%)	4.5		4
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	4.5		4
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	4.5		3
Total = (100%)	15		12
Nilai Pengusul = (40% x 12) / 3 = 1.6 (Penulis Kedua)			

Catatan Penilaian artikel oleh Reviewer :

- a. Kelengkapan dan kesesuaian unsur isi artikel: Artikel ini sudah sesuai dengan aturan standar penulisan ilmiah dalam International Conference on Climate Change 2017 (abstract, introduction, literature review, research method, result, discussion, and conclusion) (skor=1)
- b. Ruang lingkup dan kedalaman pembahasan: Studi ini bertujuan untuk menghitung biaya kerugian masyarakat akibat penetapan harga PDAM di Wilayah II dengan menggunakan pendekatan deadweight loss (DWL). Hasil penelitian menunjukkan bahwa potensi kerugian (DWL) tergantung margin yang ditetapkan oleh masing-masing PDAM. Kelemah dari publikasi ini adalah tidak mempunyai referensi yang cukup untuk menjelaskan core theory dan research gap dari penelitian sebelumnya (skor=4)
- c. Kecukupan dan pemutakhiran data/informasi dan metodologi : Data yang dipergunakan dalam penelitian ini cukup mendalam yakni kinerja PDAM yang belum mempunyai manajemen, efisiensi dan tata kelola perusahaan yang baik pada tahun 2015 (skor =4)
- d. Kelengkapan unsur dan kualitas terbitan : Konferensi yang diikuti cukup bermutu yang dilaksanakan setiap tahun yang dilakukan oleh IOP (skor=3)
- e. Indikasi plagiat: Berdasarkan tes semiliritas hanya sebesar 17%, maka dapat dinyatakan tidak ada indikasi plagiat.
- f. Kesesuaian bidang ilmu: Sangat sesuai bidang ekonomi terutama dalam bidang ekonomi pembangunan

Surakarta, 04 DEC 2020

Reviewer 1

Lukman Hakim., SE., M.Si., Ph.D

NIP. 196805182003121002

Jabatan : Lektor Kepala

Pangkat, Gol Ruang : Pembina / IV/a

Unit Kerja : Fakultas Ekonomi dan Bisnis

Bidang Ilmu : Ekonomi Pembangunan

*Dimilai oleh dua Reviewer secara terpisah

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