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Welfare Effects, Government Policies, and Deadweight Loss

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Synonyms

Deadweight loss; Fiji; Monopoly; Samoa; Welfare effects

Definitions

Monopoly	There is one seller or provider of product or service
Welfare effects	Refers to the impact of the actions by an economic unit on the well-being of individuals in society

Introduction

One of the important roles of the government is to provide public goods to the society. The state tries to provide those goods that may be difficult for the private sector to provide in a way that maximizes public welfare (Schmitz 2015; Jack and Recalde 2015). Globally, there are many state-owned monopolies that have been entrusted with this task. Monopolies exist due to various reasons associated with technical and legal barriers to entry. There are many advantages of state-owned monopolies. First, state-owned monopolies can undertake research and development with the aid from the government. It has been noted in many studies that innovative activities carried out by monopolies enhances social welfare (Yao and Gan 2010; Li and Wang 2010; Chu et al. 2012; Spulber 2013). Second, the state-owned monopolies can incur a low marginal cost over a wide range of output. This leads to technical barriers to entry while benefitting consumers in the long run. In the developing countries, it is difficult to find monopolies whose benefits to the society outweigh the costs that they have on the society.

Moreover, there are many disadvantages of having a state-owned monopoly. First, monopolies generate deadweight loss. When exploring market structures, specifically monopoly market, inefficiency is an aspect that is usually associated with this market structure (Amir et al. 2016; Carlton and Keating 2015). Deadweight loss is generated when the consumer surplus that is present in the competitive market is transferred to monopoly profits. In this case the consumers lose while the monopoly benefits. Second, monopolies provide high tax revenue to the government by charging higher prices to consumers. Third, state-owned monopolies have strong government

A. Farazmand (ed.), *Global Encyclopedia of Public Administration, Public Policy, and Governance*,
https://doi.org/10.1007/978-3-319-31816-5_4029-1

support, and these disincentives them to be less accountable and transparent to the taxpayers.

The main aim of this entry is to estimate and examine the deadweight loss generated by state-owned monopolies in Fiji and Samoa. The two state-owned monopolies that were selected in this entry were Fiji Electricity Authority (FEA) and Samoa Electric Power Corporation (SEPC). (The selection of these two companies was done entirely on the availability of data.) These two state-owned entities play a crucial role in the provision of electricity to Fijians and Samoans. The performance of these two companies comes under limelight due to inefficiency factor. Additionally, this entry also seeks to examine the impact of government policies on the deadweight loss generated by monopolies.

There are two reasons why this entry needs to be conducted. First, none of the existing studies to date has examined the economic inefficiency generated by state-owned monopolies in Fiji and Samoa. Second, none of the existing studies have examined the impact of government policies on the deadweight loss generated by monopolies. This study extends the existing literature by filling these two gaps in the existing literature.

This study contributes to the existing literature in two ways. First, it emphasizes that deadweight loss is not the only loss or economic inefficiency generated by the monopoly. There are welfare losses that arise due to misallocation of public funds by the government to help the monopolies. Second, it also tries to emphasize that the monopolies will try to maximize their profits even if their profit goal is constrained by government regulation. This will distort the impact of government policies on the social welfare. (Government provides subsidies to state-owned monopolies, and these monopolies should reduce their prices so that consumers can benefit. However, these monopolies may not reduce their prices to balance off the cost that is subsidized by the government. They may reduce their prices slightly.)

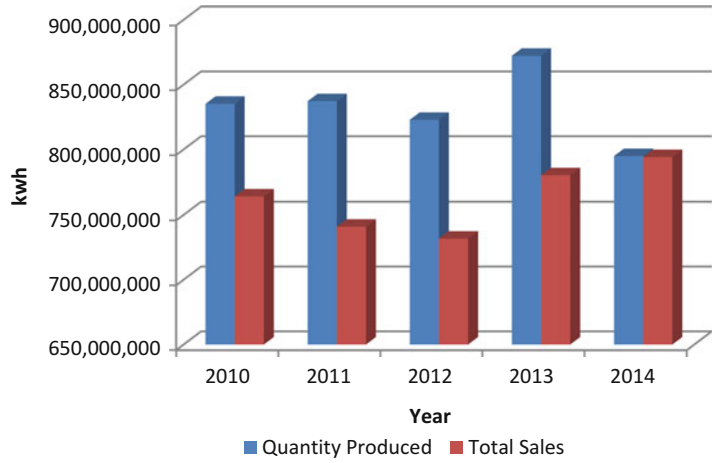
This entry is divided into six sections. Section "Overview of Fiji Electricity Authority (FEA) and Samoa Electric Power Corporation (SEPC)" provides an overview of FEA and SEPC. Section "Theoretical Framework and Literature Review" outlines theoretical framework and reviews the existing literature. Section "Data Collection and Model Specification" outlines data collection and model specification. Section "Research Findings and Discussions" presents and discusses the research findings. Section "Conclusions, Theoretical Contributions and Policy Implications" outlines the conclusion, theoretical contributions and policy implications of this entry.

Overview of Fiji Electricity Authority (FEA) and Samoa Electric Power Corporation (SEPC)

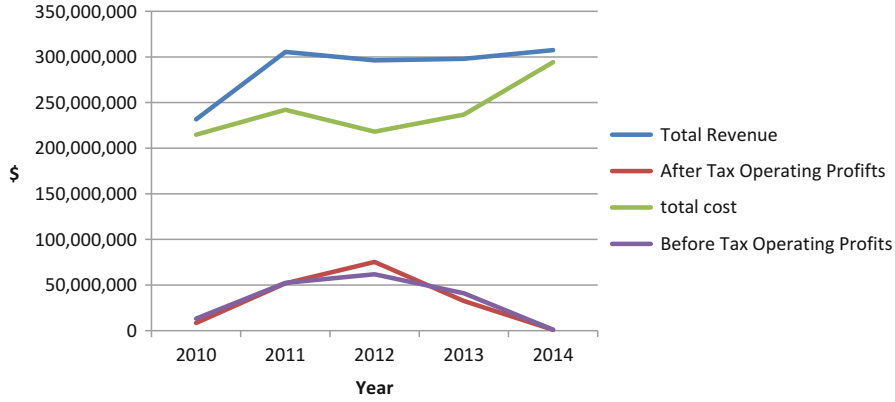
One of the key roles of national government is to effectively and efficiently deliver basic utilities to the general public. In order to effectively undertake this role, the government usually establishes state-owned enterprises and provides monopoly power to these state-owned enterprises. State-owned monopolies usually arise due to legal barriers to entry, whereby the state favors its enterprises in a number of ways. Some of these ways are providing unwarranted tax benefits and subsidies. This phenomenon is present in the utility industry of Fiji and Samoa.

Fiji Electricity Authority

The FEA is a fully owned government entity in Fiji that is regulated by the Electricity Act of 1966. The primary role of the FEA in Fiji's economy is to generate and provide electricity to the people of Fiji (Fiji Electricity Authority 2016). The power sector of Fiji has experienced structural changes in two specific time periods. These two specific time periods were in late 1990s and from year 2001 to 2013 (Dornan 2013). The initial plan of the government was to privatize the power industry, but this has never happened. In the second phase of the reform, FEA was only corporatized, and it was noticed that their performance improved because they adopted good practices from the private sector (Dornan 2013). Figure 1 shows that the production of electricity is more than the quantity consumed in Fiji.



Welfare Effects, Government Policies, and Deadweight Loss, Fig. 1 Production and consumption of electricity by FEA. (Source: Created by the authors of this paper by using data from the Fiji Electricity Authority (2010, 2011, 2012, 2013, 2014))



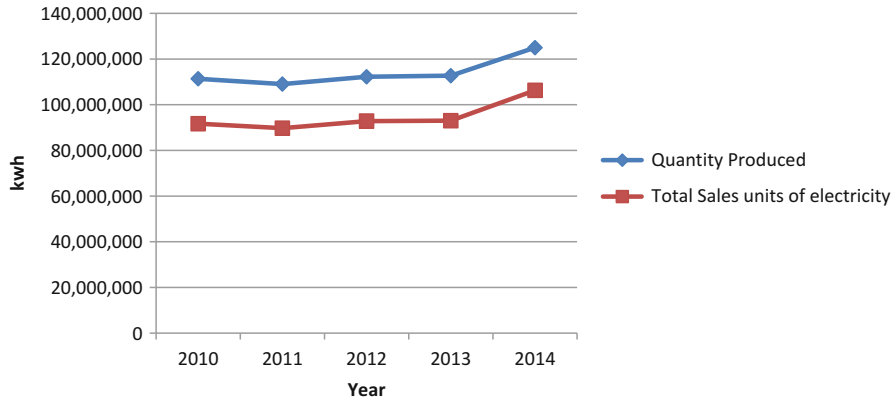
Welfare Effects, Government Policies, and Deadweight Loss, Fig. 2 Total revenue, profits and costs of FEA. (Source: Created by the authors of this paper by using data from the Fiji Electricity Authority (2010, 2011, 2012, 2013, 2014))

Figure 1 shows that the production of electricity by the FEA increased from 835,168,583 kWh in 2010 to 794,874,155 kWh in 2014. The consumption of electricity also increased from 764,232,031 kWh in 2010 to 794,113,640 kWh in 2014. Figure 2 shows that FEA's profits, total revenue, and total costs have been volatile from year 2010.

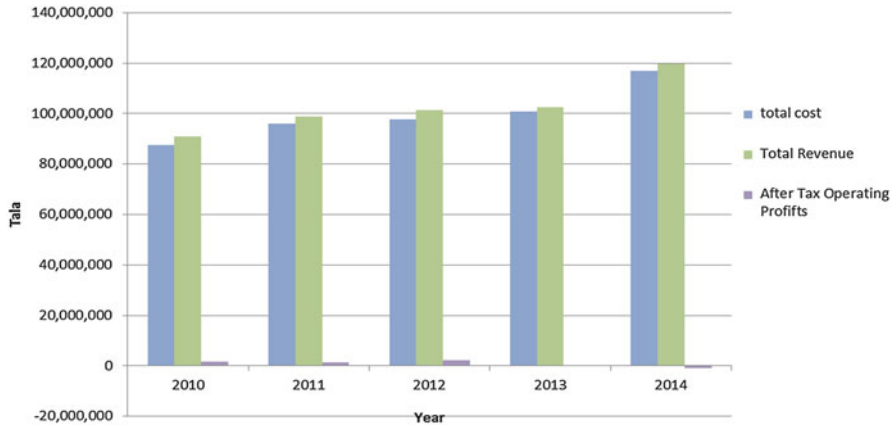
Figure 2 shows that the tax benefits provided to FEA in 2012 have pushed after tax net profits up.

Samoa Power Corporation (SEPC)

The SEPC was setup in 1972 with the main goal of provision of electricity to the general public of Samoa. This company has been in existence for the last 44 years and is governed by the Power Electric Act of 1980 (Samoa Electric Power Corporation 2014). The main goal of the SEPC is to provide electricity at affordable prices to the Samoans. The SEPC focuses on delivering its services by using sustainable and innovative practices. There are many problems faced by SEPC. Some of these challenges are managing electricity tariffs, natural disasters, volatility of fuel prices, and human resources (Samoa Power Corporation 2014). The government of Samoa has been supportive of the role that SEPC plays in the economy of Samoa. In an attempt to support the SEPC, the government of Samoa has exempted SEPC from paying taxes on its profits and provided annual



Welfare Effects, Government Policies, and Deadweight Loss, Fig. 3 Production and consumption of electricity by the SEPC. (Source: Created by the authors of this paper by using data from the Samoa Electric Power Corporation (2010, 2011, 2012, 2013, 2014))



Welfare Effects, Government Policies, and Deadweight Loss, Fig. 4 Total revenue, profits, and costs of SEPC. (Source: Created by the authors of this paper by using data from the Samoa Electric Power Corporation (2010, 2011, 2012, 2013, 2014))

subsidies for the provision of electricity. Figure 3 shows the production and consumption of electricity by SEPC. Figure 3 shows that the electricity produced is more than the electricity consumed in Samoa.

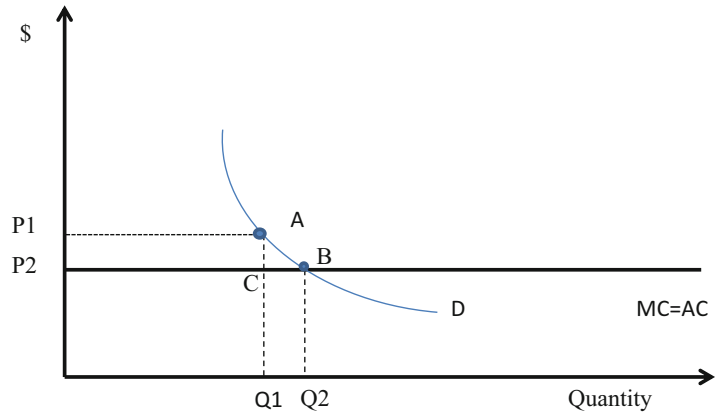
Figure 3 shows that the production of electricity by the SEPC increased from 111353960 kWh in 2010 to 124985632 kWh in 2014. The consumption of electricity also increased from 91699781 kWh in 2010 to 106280682 kWh in 2014. Figure 4 shows that SEPC's profits, total revenue, and total costs have been volatile from year 2010.

Figure 4 shows that the gap between the marginal cost and marginal revenue of the SEPC is very low. Therefore, the profits made by SEPC are low.

The next subsection will outline the theoretical framework used in this entry.

Theoretical Framework and Literature Review

It has been randomly emphasized by the existing theoretical models on welfare losses generated by



Welfare Effects, Government Policies, and Deadweight Loss, Fig. 5 Deadweight loss generated by a state-owned monopoly. (Source: Developed by the author of this paper (2016) by using information from Posner (1975))

monopolies that the society losses when government tries to provide unjustified benefits to the monopoly. These benefits can be in two forms (Posner 1975; Shleifer 2005; Solis and Maudos 2008). First, the government allows the monopoly to charge higher prices than what competitive firms would charge. This results in deadweight loss resulting in market inefficiency. Figure 5 illustrates how deadweight loss is generated by a state-owned monopoly.

In Fig. 5, point A represents the price charged by the monopoly, and point B represents the price charged by the competitive market. Area ABC in Fig. 5 shows the deadweight loss. Second, there is opportunity costs associated with government pumping financial resources for the improvement of the overall welfare of the monopoly at the expense of public welfare. All these factors need to be incorporated while analyzing the welfare loss associated with the state-owned monopolies. Capturing these two transmission mechanisms in the welfare loss function, we get:

$$WL_{mt} = f(\pi_{mt}, TR_{mt}, TC_{mt}; R_{mt}) \quad (1)$$

In Eq. 1, WL_{mt} is the welfare loss generated by the monopoly in period t, π_{mt} is the profit of the monopoly in period t, TR_{mt} is the total revenue of the monopoly in period t, and TC_{mt} is the total cost of the monopoly in period t. The welfare function is constrained by government regulations. Changes in government regulation have an impact on the degree of welfare loss experienced by the citizens. Therefore, R_{mt} is the regulation of the monopoly in period t. Rewriting Eq. 1 in its specific form we get:

$$TR_{mt} = p_1 f(k, l) \quad (2)$$

In Eq. 2, $p_1$is the price per unit of output of the monopoly, and $f(k,l)$ is the output produced.

$$TC_{mt} = p_2 k + p_3 l \quad (3)$$

In Eq. 3, $p_2$is the price per unit of capital, p_3 is the price per unit of labour, k is capital, and l is labor. From Eqs. 2 and 3, monopoly profits can be calculated as follows:

$$\pi_{mt} = p_1 f(k, l) - (p_2 k + p_3 l) \quad (4)$$

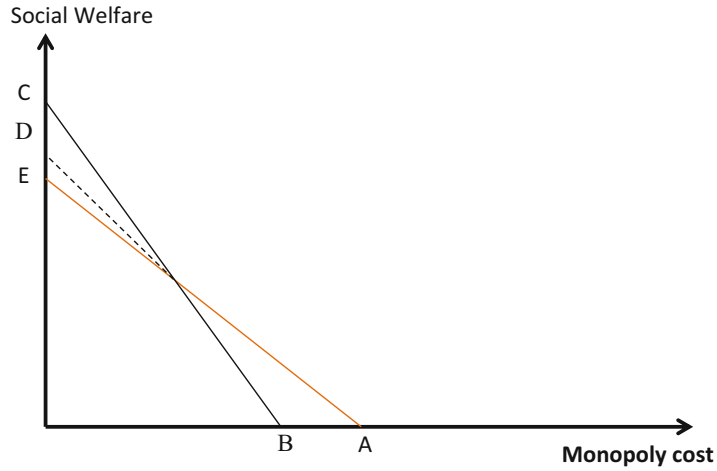
The rate of return on capital investment of a firm can be calculated as follows:

$$\text{RRKI}_{mt} = (p_1 f(k, l) - p_3 l)/k \quad (5)$$

Assuming that the rate of return on capital investment by the monopoly is constrained by government regulation denoted by m, so the monopoly Lagrangian expression subject to government regulation constraint is given as follows:

$$\mathcal{L} = p_1 f(k, l) - (p_2 k + p_3 l) + \lambda(p_3 l + mk - p_1 f(k, l)) \quad (6)$$

Differentiating Eq. 6 with respect to l, k, and λ and equating the first differential equal to 0, we get:



Welfare Effects, Government Policies, and Deadweight Loss, Fig. 6 Effect of subsidy on welfare of monopoly and social welfare. (Source: Created by authors of this paper (2016))

$$\frac{\partial \mathcal{L}}{\partial l} = p_1 f_l - p_3 + \lambda(p_3 - p_1 f_l) = 0 \quad (7)$$

$$\frac{\partial \mathcal{L}}{\partial k} = p_1 f_k - p_2 + \lambda(m - p_1 f_k) = 0 \quad (8)$$

$$\frac{\partial \mathcal{L}}{\partial \lambda} = p_3 p_2 + mk - p_1 f(k, l) = 0 \quad (9)$$

Equations 7, 8, and 9 capture the effect that a monopoly will try to maximize profits in the midst of regulatory constraints. There are two ways how monopolies will be able to foster this. First, if the government is charging higher taxes on profits, monopoly will try to reduce the burden of the tax by increasing their marginal revenue per unit of output and reducing marginal cost. Second, if the government provides subsidy to the monopoly, it may choose to continue to charge the same price as it has the market power to do so. Alternatively, the monopoly can also reduce the price if the government pressures them to do so.

There are two ways how this entry contributes to the existing literature. First, it emphasizes that deadweight loss is not the only loss or economic inefficiency generated by the monopoly. There are welfare losses that arise due to misallocation of public funds by the government to help the state-owned monopolies. Second, it also tries to emphasize that the monopolies will try to maximize their profits in the midst of regulatory constraint. This will distort the impact of policies on the social welfare. Figure 6 captures this by using the budget constraint framework.

Figure 6 shows that if the government provides subsidy, the production cost of monopoly should decrease, and economic welfare should increase from E to C. However, monopolies can still charge higher prices because they have total control of the market. This results in the graph to shift from E to D causing less increase in social welfare.

Literature Review

There have been many notable debates in the academic literature on the impact of monopoly on the national economy (Hałaburda and Yehezkel 2013). One of the notable issues highlighted in the existing studies is that monopolies cause deadweight and price discrimination (Wang and Chen 2012). This leads to economy inefficiency and loss of economic welfare. Undoubtedly, the topic on deadweight loss and price discrimination is a notable one, but to date much hasn't been done to estimate deadweight loss (Wang and Chen 2012). The existing literature on the effects of monopoly on national economy can be divided into two categories. First is the economic inefficiency caused by monopolies (Flynn et al. 2009; Morita and Waldman 2010; Hałaburda and Yehezkel 2013; Kim and Lee 2014) and the second is the impact of regulation on the welfare losses generated by the monopoly (Goolsbee 2006; Liu and Lu 2015). This subsection will review existing studies on these two categories.

Deadweight Loss and Monopoly Behavior

Deadweight loss is an economic inefficiency that arises when monopolies charge higher prices to consumers, resulting in the transfer of consumer surplus to the monopoly profits (Flynn et al. 2009; Morita and Waldman 2010). Chen and Sappington (2011), Hałaburda and Yehezkel (2013), and Kim and Lee (2014) found that deadweight loss from a state-owned monopoly may be high as compared to a monopoly from the private sector. Private sector monopolies tend to be more transparent in disclosing information to public and may face strict government regulation, while the state-owned monopolies are supported and backed by the government; therefore there is less incentive for them to disclose information to public. Wang and Chen (2012) argued that there are many countries around the world that have been implementing reforms in the energy sector to improve the efficiency of the energy sector. During the 1980s, the government of China encouraged the private sector to invest in the energy sector because there was a massive shortage of electricity supply in China. In the recent years, the private sector is losing interest in the energy sector of China with the government-owned monopoly becoming stronger day by day. Wang and his colleague argued that the development of this relative monopoly may be harmful to the interest of the general public. (Relative monopoly is also known as imperfect monopoly. A relative monopoly is one where the product sold by the monopoly does not have a close substitute but may have a remote substitute. For example, the remote substitute of mobile phones may be landline phones.) Yao and Gan (2010) analyzed the impact of monopoly innovation on the welfare of consumers. Yao and his colleague emphasized that previous studies have used partial equilibrium model to assess the welfare impact of monopoly and found that monopoly innovation leads to greater welfare loss. This study also found that technological advancement increases social welfare. Cowan and Vickers found that a monopolist's third-degree price discrimination has ambiguous effects on social welfare. Neumann (1999), Lee (2006), and Reksulak et al. (2008) found that welfare loss tends to increase as the monopoly exercises greater power over innovative activities. Kahana and Katz (1990) examined the welfare loss that arises from the rent seeking behavior of a price discriminating monopolist. This study found that price discrimination increases social welfare loss as some consumers are better off than others (see Table 1 for the summary of these studies).

Impact of Government Regulation on Monopoly Behavior

Harberger (1954) and Worcester (1973) considered the notion of quantifying allocation of resources and welfare impact of monopoly. By using data from various industries, this study found that misallocation of resources that may be induced by government policies increases welfare loss of the consumer by 0.1%. Building on these students, Jenny and Weber (1983) found that welfare loss ranged from 0.85% to 7.39% of the GDP. Goolsbee (2006) found that when the taxes on monopoly profits increases, the deadweight loss will also increase as consumers will be charged higher prices to offset the losses that monopoly's experience by paying the government taxes on profits. Darby and Zucker (2006) debunked the myth that technological advancement may only benefit consumers under competitive market but not under monopoly market. Viani (2007) used data from 74 countries to determine the reasons for the rise of monopoly in different countries. This study found that some of the factors that give rise to the monopoly are financial constraint of the government, political notion, and election preference. When government grants companies monopoly rights, they are able to increase their revenue by 66%. Lakdawalla and Sood (2009) study on the US and European pharmaceutical industry found that there is an opportunity cost associated with providing monopolies with unwarranted government financial support. The financial resources invested in the state-owned monopolies can be rechanneled to other priority areas of the nation because these monopolies generate deadweight loss at the expense of public funds. Lin and Jiang (2011) found that by eliminating subsidies for the electricity industry of China, the demand

Welfare Effects, Government Policies, and Deadweight Loss, Table 1 Summary of studies reviewed for this paper

No	Study	Theme					
		Welfare loss	Innovation	Regulation	National economy	Deadweight loss	Price discrimination
1	Hałaburda and Yehezkel (2013)	√			√		
2	Wang and Chen (2012)					√	√
3	Flynn et al. (2009)					√	
4	Morita and Waldman (2010)					√	
5	Kim and Lee (2014)	√					
6	Goolsbee (2006)	√		√			
7	Liu and Lu (2015)	√		√			
8	Chen and Sapping (2011)						√
9	Yao and Gan (2010)	√	√				
10	Cowan and Vickers (2007)	√					√
11	Neumann (1999)	√	√				
12	Lee (2006)	√	√				
13	Reksulak et al. (2008)	√	√				
14	Kahana and Katz (1990)	√					√
15	Harberger (1954)	√		√			
16	Worcester (1973)	√		√			
17	Jenny and Weber (1983)	√					
18	Darby and Zucker (2006)		√				
19	Viani (2007)			√			
20	Lakdawalla and Sood (2009)				√	√	
21	Lin and Jiang (2011)				√		√
22	Crawford et al. (2011)	√		√			

Source: Developed by the authors of this paper by using information from existing literature

for electricity will significantly fall as the prices of electricity will increase. Crawford et al. (2011) found that monopoly power leads to deterioration of the quality of service delivery in the cable industry when the government provides unjustified support for the monopoly. Liu and Lu (2015) argued that cutting taxes on the profits of the US monopolies will improve social welfare (see Table 1 for the summary of these studies).

A close synthesis of the above literature shows that there are many studies that have proposed models for deadweight loss generated by monopoly. However, very few studies have constructively applied these models and calculated deadweight loss generated by state-owned monopolies. Similarly, the impact of government regulation on the behavior of monopoly has been applied at the macro level rather than at the micro level. This study contributes to the existing literature in two ways. First, none of the existing studies have examined the welfare loss generated by monopolies in the Pacific Island Countries. This study examines the welfare loss generated by monopolies in Fiji and Samoa. Second, this

entry used the Harberger (1954) framework for estimating deadweight loss that was later polarized by Worcester (1973), Jenny and Weber (1983), and Reksulak et al. (2008). Harberger (1954) framework is one of the most popular and cited studies in the existing literature. Using this framework in this study will enable research findings to be compared with existing studies.

Data Collection and Model Specification

Data Collection

The main aim of this entry is to estimate and examine the deadweight loss generated by state-owned monopolies in Fiji and Samoa. This entry also seeks to examine the impact of government policies on the deadweight loss generated by monopolies. Two monopolies were selected in this entry. These two monopolies were the FEA and SEPC. The selection of the companies to be studied in this entry was done entirely on the availability of data. To determine the economic inefficiency generated by monopolies before and after regulation, we needed data on price, quantity produced, profits and cost. We collected data from the annual reports of FEA and SEPC. Data from the year 2010 to 2014 were collected, and deadweight loss for each period was calculated. The marginal revenue and elasticity were held constant on annual basis.

Model Specification

In this entry, Harberger (1954) framework for estimating deadweight loss that was later polarized by Worcester (1973), Jenny and Weber (1983), and Reksulak et al. (2008) will be used for estimating the deadweight loss. For estimating deadweight loss after regulation, we will equate marginal revenue (MR) equal to marginal cost (MC). Constant marginal cost on annual basis is given by *mc*. (This may include the combination effect of both taxes and subsidies.) The demand curve of the monopoly with the constant price elasticity of demand is captured by Eq. 10 below:

$$Q = p_1^{e_{q,p}} \tag{10}$$

In Eq. 10, q is quantity, p_1 is the price, and $e_{q,\,p}$ is the price elasticity of demand. The elasticity of demand was calculated by using the following equation:

$$e_{q,p} = \left(\frac{Q_2 - Q_1}{P_2 - P_1}\right) * \left(\frac{P_2}{Q_2}\right) \tag{11}$$

In Eq. 11, Q_1 and Q_2 are the quantities of the respective periods, and P_1 and P_2 are the prices from the respective periods. The first step involved in estimating the deadweight loss is to compare the consumer surplus of monopoly with consumer surplus of the competitive market. The ratio of consumer surplus is given as follows:

$$\frac{\text{CONSUM}}{\text{CONSUC}} = \frac{1}{1 + \left(\frac{1}{e_{q,p}}\right)^{e_{q,p}+1}} \tag{12}$$

In Eq. 12, CONSUM is consumer surplus for the monopoly, and CONSUC is consumer surplus for the competitive market. Dividing the profit function of the monopoly (see Eq. 4) with CONSUC and simplifying we get:

$$\text{DWL} = \frac{\pi_{mt}}{\text{CONSUC}} = \frac{e_{q,p}}{1 + e_{q,p}}^{e_{q,p}} \tag{13}$$

In Eq. 13, DWL represents deadweight loss.

Research Findings and Discussions

Table 2 shows that the consumer surplus ratio for monopoly to competitive market increased from −0.19 in 2011 to 0.48 in 2014. The deadweight loss also increased from −1.28 to 0.27 in 2014. In 2013, 81% of consumer surplus that may be present in the competitive market was transferred into monopoly profits. In 2014, 48% of consumer surplus that may be present in the competitive market was transferred into monopoly profits.

Table 3 shows that consumer surplus ratio for monopoly to competitive market increased from −0.33 in 2011 to 0.34 in 2014. The deadweight

Welfare Effects, Government Policies, and Deadweight Loss, Table 2 Elasticity, marginal cost, monopoly and competitive market consumer surplus ratio and deadweight loss for FEA

Year	Elasticity	MC=AC	M:CM	DWL
2011	−0.132380204	0.326742491	−0.19	−1.28
2012	−0.695476356	0.298089833	−1.28	−0.56
2013	−1.084923055	0.303485746	0.81	0.06
2014	−2.229784542	0.370580463	0.48	0.27

Note:
MC is marginal cost
AC is average cost
M:CM: monopoly and competitive market consumer surplus ratio
DWL: deadweight loss

Welfare Effects, Government Policies, and Deadweight Loss, Table 3 Elasticity, marginal cost, monopoly and competitive market consumer surplus ratio and deadweight loss for SEPC

Year	Elasticity	MC=AC	M:CM	DWL
2011	−0.198631946	1.06997636	−0.33	−1.31
2012	0.557045635	1.053348163	0.20	0.56
2013	−0.161116437	1.083862504	−0.25	−1.3
2014	5.049770304	1.101390702	0.34	0.40

Note:
MC is marginal cost
AC is average cost
M:CM: monopoly and competitive market consumer surplus ratio
DWL: deadweight loss

loss also increased from −1.31 in 2011 to 0.40 in 2014. In 2012, 20% of consumer surplus that may be present in the competitive market was transferred into monopoly profits. In 2014, 34% of consumer surplus that may be present in the competitive market was transferred into monopoly profits.

Table 3 shows that the consumer surplus ratio for monopoly to competitive market increased from −0.33 in 2011 to 0.34 in 2014. The deadweight loss also increased from −1.31 in 2011 to 0.40 in 2014. This entry noted that FEA and SEPC recorded positive deadweight loss during the periods when transfer of consumer surplus to monopoly profits was high. There are a number of factors that have caused the increase in the deadweight loss generated by these two companies. One of the factors that have increased the deadweight loss is the inelastic demand for electricity. Due to fluctuations in fuel prices, the cost of fuel in Fiji and Samoa has been highly volatile. As compared to the price of electricity, the price of fuel is much higher. Therefore, people cannot easily substitute the need for electricity with other alternative commodities. Another factor that has caused inflexibility in the demand for electricity in Fiji and Samoa is the growing demand for electricity by manufacturing and business warehouses. The tourism industry of Fiji and Samoa has facilities for electricity use; therefore if the price of electricity increases, they are not able to substitute it with other products. Alternatively, some consumers in Fiji and Samoa have solar panels, but setting up the solar system is very expensive and requires large amounts of capital investment that may not be easily affordable by ordinary consumers.

The findings from this study is similar to the findings of the studies conducted by Chen and Sappington (2011), Wang and Chen (2012), Hałaburda and Yehezkel (2013), and Kim and Lee (2014). The transfer of consumer surplus

Welfare Effects, Government Policies, and Deadweight Loss, Table 4 Elasticity, competitive market consumer surplus and deadweight loss for FEA before tax on profits

Year	Profit	Competitive price=marginal cost	Elasticity	Competitive market surplus	Deadweight loss $
2011	52,427,000	0.326742491	−0.132380204	−0.436702544	−120051968.3
2012	61,836,000	0.298089833	−0.695476356	−2.271460897	−27223008.8
2013	41,024,000	0.303485746	−1.084923055	13.03025127	3148365.994
2014	1,113,000	0.370580463	−2.229784542	2.756465645	403777.9327

Welfare Effects, Government Policies, and Deadweight Loss, Table 5 Elasticity, competitive market consumer surplus and deadweight loss for FEA after tax on profits

Year	Profit	Competitive price=marginal cost	Elasticity	Competitive market surplus	deadweight loss $
2011	51,910,000	0.326742491	−0.132380204	−0.436702544	−118868096.1
2012	75,345,000	0.298089833	−0.695476356	−2.271460897	−33170282.65
2013	32,581,000	0.303485746	−1.084923055	13.03025127	2500412.258
2014	972,000	0.370580463	−2.229784542	2.756465645	352625.4723

Welfare Effects, Government Policies, and Deadweight Loss, Table 6 Elasticity, competitive market consumer surplus and deadweight loss for SEPC for before tax on profits

Year	Profit	Competitive price=marginal cost	Elasticity	Competitive market surplus	Deadweight loss $
2011	1,226,656	1.06997636	−0.198631946	−1.3173692	−931140.6386
2012	2,081,001	1.053348163	0.557045635	−0.6963767	−2988326.776
2013	369,998	1.083862504	−0.161116437	−1.2753741	−290109.3906
2014	−848,415	1.101390702	5.049770304	−0.2964811	2861615.975

estimated in this study from consumers in a competitive market to monopoly profits is relatively high. These two state-owned monopolies may be getting unwarranted support from the government to charge high prices to consumers so that the government can maximize its revenues. Wang and Chen (2012) found that the relative state-owned monopoly in China in the energy sector has strong government support, and this has maximized the social welfare loss.

Impact of Tax on Deadweight Loss

Table 4 shows that deadweight loss in dollars increased from −$120051968.3 in 2011 to $403777.9327 in 2014.

Table 5 shows that deadweight loss in dollars increased from −$118868096.1 in 2011 to $352625.4723 in 2014. Comparison of Tables 4 and 5 shows that tax on profits reduces deadweight loss generated by the monopoly.

Table 6 shows that deadweight loss in dollars increased from −$931140.6386 to $2861615.975.

The SEPC does not pay tax on its profits. In the case of Fiji, the FEA pays taxes to the government of Fiji. When government charges tax on its profits, it is able to reduce deadweight loss. By

Welfare Effects, Government Policies, and Deadweight Loss, Table 7 Elasticity, competitive market consumer surplus and deadweight loss for SEPC before fuel levy subsidy

Year	Profit	Competitive price=marginal cost	Elasticity	Competitive market surplus	Deadweight loss $
2011	−5,273,344	1.06997636	−0.198631946	−1.3173692	4002935.541
2012	−4,418,999	1.053348163	0.557045635	−0.6963767	6345702.397
2013	−6,130,002	1.083862504	−0.161116437	−1.2753741	4806434.479
2014	−7,348,415	1.101390702	5.049770304	−0.2964811	24785443.16

Welfare Effects, Government Policies, and Deadweight Loss, Table 8 Percentage change in deadweight loss by providing fuel levy subsidy to SEPC

Year	DWL before fuel subsidy	DWL after fuel subsidy	% change
2011	4,002,936	−931,141	−123.261445
2012	6,345,702	−2,988,327	−147.092136
2013	4,806,434	−290,109	−106.035854
2014	24,785,443	2,861,616	−88.454449

Welfare Effects, Government Policies, and Deadweight Loss, Table 9 Percentage change in deadweight loss by charging taxes on profits for FEA

Year	DWL before tax on profits	DWL after tax on profits	% change
2011	−120051968.3	−118868096.1	−0.98613
2012	−27223008.8	−33170282.65	21.8465
2013	3148365.994	2500412.258	−20.5806
2014	403777.9327	352625.4723	−12.6685

DWL represents deadweight loss

charging taxes, the government of Fiji has reduced the deadweight loss by 0.99% in 2011, 20.58% in 2013, and 12.67% in 2014. By charging tax to the FEA, the government of Fiji can use tax collections for priority areas in the country that needs greater attention. Some of these priority areas are health, education, poverty alleviation, and natural disaster management. The findings from this study contradict with the findings from the study conducted by Liu and Lu (2015). This study argues for taxing monopoly on their profits while Liu and Lu (2015) argue against taxing monopoly on their profits.

Impact of Fuel Levy Subsidy on Deadweight Loss

Table 7 shows that by eliminating fuel levy subsidy, deadweight loss generated by SEPC will increase from $4002935.541 in year 2011 to $24785443.16 in 2014. By providing fuel levy subsidy, the government has significantly reduced the deadweight loss generated by the monopoly.

Table 8 shows that by providing fuel levy subsidy, the government of Samoa has reduced the deadweight loss by 123% in 2011, 147.09% in 2012, 106.03% in 2013, and 88.45% in 2014.

Table 9 shows that by charging taxes, the government of Fiji has reduced the deadweight loss by 0.99% in 2011, 20.58% in 2013, and 12.67% in 2014. The deadweight loss increased in the year

2012 because the government provided tax benefits to FEA and this increased by 21.85%.

The government of Samoa provides fuel levy subsidy to SEPC. From year 2012 to 2014, the government of Samoa provided fuel levy subsidy to SEPC amounting to a constant amount of $6,500,000 per year. By providing fuel levy subsidy to SEPC, the government of Samoa has reduced the deadweight loss by 123% in 2011, 147.09% in 2012, 106.03% in 2013, and 88.45% in 2014. Deadweight loss decreased when the government of Samoa provided subsidy to SEPC. By subsiding electricity production, the government of Samoa reduced the cost per unit of electricity; therefore, Samoans could enjoy provision of electricity at cheaper prices. This finding from this study is similar to the findings of the studies conducted by Harberger and Worcester (1973). These two authors argued that misallocation of resources will increase the welfare loss generated by the monopoly. Albeit, the government of Samoa is subsiding electricity production, the SEPC is still charging higher prices to consumers. Prices could have been further reduced, but, due to strong monopoly power, the monopoly may not opt to reduce prices. These are opportunity costs associated with subsiding SEPC. For instance, the fiscal stimulus provided by the government of Samoa to SEPC could have been spent on other sectors of the economy that need more attention, such as, health, and education.

Conclusions, Theoretical Contributions and Policy Implications

The main aim of this entry is to examine the deadweight loss generated by state-owned monopolies in Fiji and Samoa. This entry also seeks to examine the impact of government policies on the deadweight loss generated by monopolies. The findings from this entry showed that the deadweight loss generated by the FEA increased from −1.28 in 2011 to 0.27 in 2014. In the case of SEPC, the deadweight loss also increased from −1.31 in 2011 to 0.40 in 2014. By charging taxes, the government of Fiji has reduced the deadweight loss by 0.99% in 2011, 20.58% in 2013, and 12.67% in 2014. By providing fuel levy subsidy to SEPC, the government of Samoa has reduced the deadweight loss by 123% in 2011, 147.09% in 2012, 106.03% in 2013, and 88.45% in 2014.

There are two important theoretical contributions of this entry. First, this entry emphasizes that deadweight loss is not the only loss or economic inefficiency generated by the monopoly. There are welfare losses that arise due to misallocation of public funds to help the state-owned monopolies. There are many ways in which public funds are misallocated in Fiji and Samoa. Some of these ways are providing tax benefits to monopolies and exempting taxes on the profits of the state-owned monopolies. The government of Samoa has been providing the SEPC with subsidies. If these subsidies are subtracted from the revenues, SEPC will go in loss. Alternatively, if the government of Samoa does not provide any subsidies to SEPC, it can use these subsidies to invest in other priority areas of the nation that needs urgent attention from the government.

Second, this entry also tries to emphasize that the monopolies will try to maximize their profits even if their profit maximization goals is constrained by government regulations. This will distort the impact of government policies on social welfare. Taxes can constrain monopoly profits, while subsidies will maximize monopoly profits. If taxes on profits are high, the monopoly can recover from this loss by increasing marginal revenue and minimizing marginal cost.

There are five important policy implications of this entry. First, the government in the Pacific Island Countries lacks financial resources to improve the welfare system of their respective countries. In these countries, providing monopolies with too much support may be damaging to the public interest. In order to improve social welfare, government should tax monopolies profits. The government of Samoa should tax the profits of the monopoly and channel these funds to other areas of the economy that need fiscal stimulus for growth. Second, the government of Samoa is providing large amounts of subsidies to SEPC. It is very essential for policy makers to

analyze the opportunity cost of investing large amounts of public revenue for the benefit of the monopoly. A cost-benefit analysis needs to be conducted before the government of Samoa takes a decision on the amount of subsidy they should provide to SEPC. Third, the government should regulate the prices charged by the state-owned monopolies. This will minimize the social welfare loss and enable public to enjoy electricity services at cheaper prices. Fourth, due to inefficiency generated by the state-owned monopolies in the electricity sector of Fiji, the government of Fiji should open up markets for the private sector. This will foster competition and regulate the prices of the electricity in Samoa and Fiji. This study found that the existence of monopoly has social welfare implications in the form of loss of consumer welfare. Hence, deregulation of the market is an aspect that tends to be an attractive route to enhance consumer welfare, as it would incite competition and reduce prices. Fifth, renewable energy is a notion that has been factored in many Pacific Island Countries, where government tends to provide grants business wishing to set up renewable energy papers. The government needs to encourage investment in other forms of renewable electricity generation.

There are two limitations of this entry. First, marginal cost and elasticity were held constant on annual basis. Second, it is difficult to generalize the findings from this study to other Pacific Island Countries as this study is based on only two Pacific Island Countries. These two Pacific Island Countries are large small island countries in the Oceania region.

Future researchers can build on this study by using alternative deadweight loss estimation models that have flexible marginal cost and elasticity. Future researchers can also conduct similar studies in other small island countries in the Pacific so that findings from this study can be compared with future studies.

Cross-References

- ▶ Deadweight Loss
- ▶ Government Policies
- ▶ Monopoly Power
- ▶ Public Sector Management
- ▶ Small Island Developing Countries
- ▶ Welfare Effects

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