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Corporate social responsibility practice in resolving conflict of interests in a sustainable supply chain

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Abstract

Sustainability is more like a mandatory requirement in today's business world. This study investigates coordination decisions in a dyadic supply chain with a socially responsible manufacturer. Social aspect of sustainability is getting more attention in addressing quantitative mathematical models. With use of participative pricing applications, an extension of this mechanism is applied to resolve the conflict of interests in a retailing channel. Cause-related marketing is proved to be an effective approach in satisfying both the economic and social concerns in a business practice. Our findings prove the applicability of the proposed model. Pricing decisions of the supply chain members are successfully coordinated via a revenue-sharing contract. Sensitivity analysis shows that the channel members gain more profit under the new pricing scheme while benefiting the society in terms of social responsibility.

Keywords: Supply chain coordination, sustainability, corporate social responsibility, pricing

1-Introduction

Today's competitive business environment, demands for sustainable measures in all three decision levels in supply chain management; operational, tactical and strategical. Sustainability is becoming more of a mandatory requirement for businesses and it is divided into three main pillars; social, environmental and economic concepts (Dal Mas et al., 2022). Social concerns in scope of sustainability are mainly addressed through corporate social responsibility (CSR). CSR is a mainly described as a business model, where corporations try to run their business in order to increase the sustainability of their consumer's environment and society (Sheehy, 2015). CSR enhances both brand image of businesses and social environment. These initiatives are designed to enhance social aspects of sustainability practice. Over the past years, there is been a huge interest among academics and practitioners to investigate social responsibility practice in corporations and businesses. However, this concept lacks in introducing quantitative real-world applications. Environmental conservation policies are becoming an undeniable strategic aspect of these day's business order (Kroes et al., 2012).

Addressing conventional business practice, cost-benefit trade-off was the only priority up to recent years. However, growing number of socially aware consumers have changed this trend by their sensitivity toward socially responsible businesses. Many corporates actively engage in activities to introduce their business image as a socially responsible company and echo this image.

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These activities range from investments in environmentally conscious business practice and improving labor policies to the working conditions, engaging in charity work, volunteer beneficial social work and philanthropic ethically oriented practice (Ahmad et al., 2021). For instance, Salesforce, the big provider of customer relationship software management tools, contributes to human resource through its unique CSR program. This company provides it employees with paid volunteer hours and has designed incentives for taking these hours. One of the main contributions of the CSR practice to the companies' bottom line is in sales and marketing. Cause-related marketing is one the sales drivers and has proven to be effective if proper market place is targeted with it. Walgreens, one of the largest pharmacy stores in the United States has partnered with Red Nose Day as its marketing campaign and cause-related marketing scheme (Heydari et al., 2020).

Participative pricing schemes are developed to absorb the most possible consumers' willingness to pay. One of the well-known participative pricing strategies is name-your-own-price. In this scheme, there is pre-determined confidential threshold price. Consumers are free to announce their own price and the service/product provider rejects the offers below the threshold. This practice is proven to be effective in marketing and price discrimination. There is a rise in number of businesses allowing their consumers to pay as they want (Lacour and Lacour, 2019). On the other hand, there are several arguments on whether a NYOP could benefit the core function of the corporations or not (Kim et al., 2009). Riener and Traxler (2012), monitoring a participative pricing enabled restaurant in a two years window, reported that although the average payment per meal is decreased but the frequency of daily purchases increased.

One other well-known scheme in participative pricing is pay-what-you-want (PWYW) pricing mechanism. In this strategy, despite the NYOP scheme, potential buyers choose to pay their desired value for a given service or commodity. In PWYW scheme the provider of the service/ commodity could end up with nothing for each purchase. In some modified versions of this pricing strategy a floor price is determined to avoid business bankruptcy. These selected prices could also help buyers in determining the rational price for a given service and commodity they received. A participative pricing mechanism could elevate sales quantity despite a possible decrease in average selling price. This mechanism is more suitable for tangible and less expensive services. Generally, participative pricing strategy is best applied in low-competition marketplaces. One of the early commercial uses of participative pricing was conducted by music artist Keith Green for his 1980 album "*So You Wanna Go Back to Egypt*". Similarly, the *Radiohead* music band used a participative pricing scheme to sell the "*In Rainbows*", online (Marett et al., 2012). However, this mechanism could lead to huge revenue loss if it is not installed properly. For instance, "*Lentil As Anything"*, a famous pay-what-you-want restaurant got out of business in recent years. There are 13 restaurants around the world that uses participative pricing practice[1].

This study integrates sustainability practice of the business owners with an elevated NYOP scheme in order to extract the most possible revenue from the market with respect to the sustainability considerations. The proposed pricing mechanism is focused on socially concern costumers through a cause-related marketing scheme. The remainder of this paper is organized as follows; the related literature is reviewed in Section 2. In Section 3 the proposed model and its assumptions are presented. Then, a revenue sharing contract is introduced to resolve the channel conflict. Section 4 analyzes the numerical results and sensitivity analysis. Finally, conclusions and future research opportunities are highlighted in section 5.

2-Literature review

The literature related to this study is rooted in three different research fields; supply chain coordination, sustainable supply chain management and pricing decision optimization. In supply chain coordination, there is been a rich argument on different aspects of the problem (Tseng et al., 2019).

[1] Road Affair, https://www.roadaffair.com/pay-what-you-want-restaurants/ (accessed 20 February 2022)

Academics and practitioners have shed light into every aspect of this phenomenon, interested readers may refer to (Heydari et al., 2019; Heydari et al., 2020). On sustainable supply chain management, however, a lack of mathematical arguments especially addressing the social pillar of sustainability is noticeable (Tseng et al., 2019). This area is investigated thoroughly in this section. Last but not least, pricing decisions are abundantly investigated in the literature (Sabbaghnia and Taleizadeh, 2020). This operational/tactical level decision is considered in every common supply chain optimization problem. However, as the social responsibility and its applications is getting more attention these days, researchers are getting more interested in examining pricing decisions in social aspects of sustainability.

Sustainability is divided into three main pillars, economic, environmental and social (Cai and Choi, 2020). Economic pillar of sustainability is been under the scrutiny of the researchers and business owners for many years (Hosseini-Motlagh et al., 2019), however the environmental and social aspects of sustainability were not under the spotlight until the recent years (Zhang et al., 2015). Sustainability performance of the business has attracted both academics and practitioners (Salmanzadeh-Meydani et al., 2022). In environmental efforts, low-carbon policies are the main research stream and has attracted interests of business owners, business planners, researchers, governmental and non-governmental activists. On the contrary, the literature body on joint environmental and social efforts is rare. Only in recent years, the joint problem of supply chain management and carbon-sensitive policies have got the attention (He et al., 2020; Lee and Choi, 2021; Qian et al., 2020). Corporate social responsibility is conveying a wide range of definitions and focuses on a broad range of issues, e.g., work environment, company governance, safety, and possible applications on economic development. A majority of large corporates due to the rapid growth of consumers' social awareness changed their strategical policies in favor of social responsibility. In today’s business world, leading international brands like Nike, Exelon, PG&E, Starbuck's, and, Mercedes actively invest in corporate social responsibility activities (Modak et al., 2016).

Hsueh and Chang (2008), was one of the first attempts on using social responsibility concept in coordinating the channel decisions. Later, Hsueh (2014) and Hsueh (2015), analyzed and explored performance of the key decisions in a socially aware business environment. Surveys indicates that the analysis on the qualitative aspects of corporate social responsibility issue are deep and rich, however, there are rarely well-addressed qualitative models on corporate social responsibility activities, let alone in sustainable supply chain coordination issue. Existing studies focus on two-echelon supply chains with certain and deterministic demand patterns (Moradi et al., 2018). To address more realistic case studies, there is an urgent need for more complex demand structures (Raza, 2018), and channel relations (Liu et al., 2018a).

Majority of the existing efforts on corporate social responsibility presents a vague definition on the key features of this concept and mostly interprets it as a demand booster (Goering, 2012). Although there are few efforts on introducing a real-world application to the social behavior of the firms and corporations, the majority of the studies fails in shaping a real-world case for their assumptions (Heydari and Mosanna, 2018; Jamali and Rasti-Barzoki, 2018; Panda and Modak, 2016; Seyedhosseini et al., 2019). A detailed comparison between the present study and the existing corporate social responsibility-related studies in sustainable supply chain coordination problem is presented in Table. Evident from literature review table, price is an inevitable variable to be considered. Further, on social aspect, CSR investment and consumer surplus has been under the scrutiny of the academics. Finally, on real-world applications there is noticeable drought in number of mathematical modelling studies.

Table1. The comparison on present study setting and existing CSR-related literature

Authors	Contract	Demand factors and decision variables			Real-world application
		Price	CSR investment	Consumer surplus	
Ni et al. (2010)	Wholesale price	*	*		
Goering (2012)	Two-part tariff	*	*		
Hsueh (2014)	Revenue sharing	*	*		
Panda (2014)	Revenue sharing	*		*	
Modak et al. (2016)	Revenue sharing	*		*	
Ma et al. (2017)	Wholesale price	*	*		Advertisement
Panda et al. (2017)	Revenue sharing	*		*	
Heydari and Mosanna (2018)	Cost sharing	*			Donation
Raza (2018)	Revenue sharing	*	*		
Liu et al. (2018b)	-	*		*	
Liu et al. (2019)	Revenue sharing	*		*	
Modak et al. (2019)	Two-part tariff	*			Social work
Seyedhosseini et al. (2019)	Two-part tariff	*	*		
Mahdiraji et al. (2020)	Revenue sharing	*	*		Advertisement
Tian et al. (2020)	Revenue sharing	*	*		
This study	Revenue sharing	*	*	*	Market potential, Donation and participative pricing

This study aims to analyze and investigate the channel pricing decisions and resolve double marginalization effect through a novel marketing scheme and revenue-sharing contract. Consumers' environmental and social awareness along with global warming and climate change has brought new order to business regulations. Market, in its broad meaning, is interpreting the social responsibility more of a business requirement than the competitive advantage. This new trend has forced corporates to take responsibilities for their social and environmental impact. Sustainability is shifting from a competition advantage to a business requirement. This paradigm shift is boosted due to the preferences of the consumers and the buyers. Understanding this new order, the present study addresses the gap in mathematical and quantitative studies in retailing channel, exploring the behavior of business owners and retailers in a more socially concern market.

3-The proposed model

In this study a dyadic supply chain with socially aware demand market is proposed to be investigated in terms of the coordinated decisions. This supply chain in consisted with a manufacturer[2] who produces a single item and sells it to a single retailer. Retailer is charged w per unit and sells the purchased items at price p per unit. To this point, the proposed structure represents a conventional retailing channel where its members will optimize their decisions based on their own desire to increase profit. As discussed on the literature review section, the rising awareness of the costumers is driving business to apply social initiatives in their business practice. To do so, and to cope with this new emerging requirement, the social awareness of the consumers is taken into account. Manufacturer proposes a new pricing scheme based on philanthropic sense of socially aware costumers. In her mechanism, the buyers donate some extra money, here we name it expected extra payments and is simplified with μ. This parameter is determined based on the social awareness of the consumers and elevates the manufacturer's interest in investing in social responsibility practice. This parameter is considered as a given value and some sensitivity analysis is conducted to study its effect on the behavior of the proposed model. In return, the manufacturer adds an additional α-percent to the final accumulated donations. In this

[2] For sake of convenience, we assume that the manufacturer is a female and the retailer is male.

approach the final value of donations is raised by (1+α)-percent. To build up the required structure, retailer's cost per sale in donation is considered as his handling cost and introduced by h. As the body of the literature shows, the common form of reverse demand function is the additive form. In this study, socially aware consumers' purchase intentions expand the potential market size. This assumption improves the common from $D = A - bp$ to $D = (1 + \alpha)A - bp$. Further, the decision-variables are 1) manufacturer's participation rate (α) and b) retailing price (p). These variables are studied in two different scenarios. In the first scenario the only variable is the manufacturer's promise on donation values, while in the second scenario, both the retailing price and the participation rate are optimized. In both scenario the manufacturer is the Stackelberg game leader. The profit functions of the supply chain members are developed as follows:

$$\Pi_R = \big((1 + \alpha)A - bp\big)(p - w - h) \tag{1}$$

$$\Pi_M = \big((1 + \alpha)A - bp\big)\big(w - c - \alpha\mu p\big) \tag{2}$$

$$\Pi_{SC} = \big((1 + \alpha)A - bp\big)(p - c - h - \alpha\mu p) \tag{3}$$

In equation (1), the retailer's profit values are calculated based on his total sale. In this equation, first expression is the potential sales quantity which is multiplied with the profit per unit, profit per unit is calculated through the difference between selling price, wholesale price paid for unit and unit handling cost of the manufacturer's pricing scheme. Equation (2) describes the manufacturer's profit values based on both conventional business practice and the novel pricing scheme. Manufacturer is expected to pay $\alpha\mu p$ per unit sold in cause-related marketing campaign. In this equation, final earning of the manufacturer is determined based on her participation rate and costumer's donation quantities. Its participation rate is determined through optimization of the proposed utility function, α, furthermore, μp represents the expected donation of the demand market.

Following, the proposed model is investigated in three different decision-making approach; centralized, decentralized and coordinated scheme. This approach is widely applied in coordination problems (Heydari et al., 2019) and pricing optimization area (Sabbaghnia and Taleizadeh, 2020). Centralized decision-making approach occurs when all the supply chain members act in an integrated manner, this scheme is the best possible outcome for the supply chain. However, in real-world problems supply chain members act in decentralized manner and try to optimize their own profit function independently. This behavior creates a gap between these two decision-making scenarios. This profit gap introduces a potential in moving toward a more integrated decisions if a proper coordinating mechanism is introduced. The possibility of coordinated decisions is discussed over a revenue-sharing contract in the following sections. As it turns out, a proper revenue-sharing contract could benefit both members of the proposed dyadic supply chain.

3-1-Decentralized decision-making scheme

In real-world applications, supply chain members try to optimize their profit functions independently. This behavior may cause loss to other members. It is proven that the decentralized decision-making scenario is a lower-bound to the possible earnings in a supply chain with rational members (Seyedhosseini et al., 2019). To analyze the proposed model, first the optimal decisions of the supply chain members are determined under decentralized decision-making scenario. In a Stackelberg game setting, where the manufacturer is the leader party, we have:

Theorem 1. Under the decentralized decision-making scheme, for given wholesale price the optimal values of α and p are:

$$\alpha^d = \pm \frac{\sqrt{A^2 + 3b^2(w + h)^2 + \frac{6Ab(w - c)}{\mu}}}{3A} - \frac{2}{3} \tag{4}$$

$$p^d = \frac{A(1+\alpha)+bw}{2b} = \frac{\big(A+3b(w+h)\big)+\sqrt{A^2+3b^2(w+h)^2+\frac{6Ab(w-c)}{\mu}}}{6b} \tag{5}$$

Proof.

Since the manufacturer is the leader entity in the proposed Stackelberg-game model, and $\frac{\partial^2 \Pi_R}{\partial (p)^2} < 0$, retailer's utility is concave in p for a given wholesale price. Applying first order optimality condition $\frac{\partial \Pi_R}{\partial p} = 0$, and some calculus on $\frac{\partial \Pi_M}{\partial \alpha} = 0$ and $\frac{\partial \Pi_R}{\partial p} = 0$, and since the Hessian is negative-definite at (α, p), then Π_{SC} attains an isolated local maximum at (α, p). The proof is complete. ■

Lemma 1. A feasibility constraint of the proposed model is argued by $p > w$. Furthermore, donation quantities and handling cost could tighten this inequality and reinforce the condition. Using some calculation on equations (4) and (5) from theorem 1., we have; $p > w + h$.

3-2-Centralized decision-making scheme

If the supply chain is managed by a single entity, are the decision of the supply chain members are integrated, instead of supply chain members, the total utility of the business is about to be optimized. It is proven that the centralized decision-making scenario is an upper-bound to the total possible earnings in a supply chain with rational members(Toktaş-Palut, 2021). To analyze the proposed model, we have:

Theorem 2. Under the integrated decision-making scheme, for given wholesale price the optimal values of α and p are:

$$\alpha^c = \frac{5-\mu \pm \sqrt{(1+\mu)^2+\frac{12\mu b(c+h)}{A}}}{6\mu} \tag{6}$$

$$p^c = \frac{A(1+\mu) \pm A\sqrt{(1+\mu)^2+\frac{12\mu b(c+h)}{A}}}{6b\mu} \tag{7}$$

Proof.

In centralized decision-making scheme, since the Hessian is negative-definite at (α, p), then Π_{SC} attains an isolated local maximum at (α, p). The proof is complete. ■

3-3-Coordinated decision-making scheme

Supply chain coordination is commonly achieved via contracts in real-world applications. One of the most common contracts in resolving conflict of interests in retailing channels, is the revenue sharing contract (Bart et al., 2021). This mechanism proved to be applicable in a wide range of problems and business environments. In this study, a conventional revenue-sharing contract is introduced and applied on the proposed model. This contract is consisted of two controlling parameters yet to be calculated. These two parameters are referred to as the revenue-sharing contract conditions. To determine the values and conditions of this contract the one entity who earns better on centralized decision-making scheme is ought to calculate the conditions of the revenue-sharing contract (Heydari et al., 2019). The other member agrees to determine their decisions in a coordinated scheme as long as the total earning of their business faces no loss.

3-3-1-Revenue sharing contract

Following the revenue sharing contract installation steps, and the profit functions of the supply chain members described on equations (1)-(3), the profit functions of the members are recalculated as follows:

$$\Pi_R^{cnt} = \phi\big((1+\alpha)A - bp\big)(p - w - h) \tag{8}$$

$$\Pi_M^{cnt} = \big((1+\alpha)A - bp\big)\big(w - c - \alpha\mu p\big) + (1-\phi)\big((1+\alpha)A - bp\big)(p - w - h) \tag{9}$$

$$\Pi_{SC}^{cnt} = \big((1+\alpha)A - bp\big)(p - c - h - \alpha\mu p) \tag{10}$$

Decision variable set: manufacturer's participation variable and retailer's retailing price. In this scenario the manufacturer's participation ratio and the retiling price are about to be determined in a coordinated decision-making regime. Under the second scenario we have:

Theorem 5. To convince the manufacturer to globally optimize the whole SC under coordinated scenario, it is enough to set:

$$\alpha = \frac{A(1-\phi-2\mu) \pm \sqrt{6Ab\mu\big(\phi w - c - h(1-\phi)\big) + A^2(1-\phi+\mu)^2 + 3b^2\mu^2(w+h)^2}}{3A\mu} \tag{11}$$

$$p = \frac{(1+\alpha)A + b(w+h)}{2b} \tag{12}$$

Proof.
Since the retailer's utility function under coordinated scenario is concave in p, the first order condition $\frac{\partial \Pi_R^{RSC}}{\partial p} = 0$, results in optimal values of p from the manufacturer's preceptive. By use of calculus, and since manufacturer's profit function under coordinated scenario is concave in α, the first order condition $\frac{\partial \Pi_M^{RSC}}{\partial p} = 0$, results in optimal values of α. It is optimum for the whole SC that the manufacturer and the retailer decide similar to the centralized scenario. To create such condition, it is enough to set $\Pi_R^{RSC} \geq \Pi_R^1$ and $\Pi_M^{RSC} \geq \Pi_M^1$. In this way, α and p could be calculated such that the retailer under the coordinated scenario acts as the centralized solution. The proof is complete. ■

Lemma 2. It is evident from theorem 2., that for a given *ω=w*, if $\phi \to 1$, $\beta_2^{cnt} \to \beta_2^d$ and if $\phi \to 0$, then $\alpha_2^{cnt} > \alpha_2^c$. So as the values of ϕ decreases, (for a given *ω=w*) manufacturer is earning more profit in comparison to the decentralized decision-making scenario.

The retailer is willing to participate in this plan as long as $\Pi_r^{cnt} \geq \Pi_r^d$. Recall Lemma 2., retailer is willing to move toward α_2^cas he will earn extra. To ensure that $\Pi_r^{cnt} \geq \Pi_r^d$ is satisfied, the values of ϕ needs to satisfy the following inequality;

$$\phi_{min} \geq \frac{\Big(\big(1+\alpha^d\big)A - bp\Big)(p - w - h)}{\big((1+\alpha^c)A - bp^{cnt}\big)(p^{cnt} - w - h)} \tag{13}$$

The inequality expressed on equation (12) is a polynomial expression and there is no closed-form solution in real-time computation. The same deductions of the minimum and the maximum values for the α is valid here. However, $\Pi_r^{cnt} \geq \Pi_r^d$ and $\Pi_m^{cnt} \geq \Pi_m^d$ leads to polynomial expressions as there is multiple decision variables. Comparative analysis is discussed over the sensitivity analysis of the numerical test problems.

4-Numerical results and sensitivity analysis

In this section, series of test problems are developed to investigate the behavior of the proposed model. These problems are designed to include a wide range of possible parameters. Problems are executed by MATLAB R2020b on a computer configured by Intel® Core^{TM} i7-5500U CPU @ 2.40GHz. Table 2 shows the parameter values of the designed test problems.

Table 2. Test problem values

Test problem	*A*	*b*	*c*	*h*	*w*	μ	ϕ
#1	1000	90	5	5	20	0.3	0.8
#2	1000	120	10	10	30	0.3	0.8
#3	1000	90	15	5	40	0.6	0.8
#4	1000	120	20	10	50	0.6	0.8
#5	1500	90	5	5	20	0.3	0.8
#6	1500	120	10	10	30	0.3	0.8
#7	1500	90	15	5	40	0.6	0.8
#8	1500	120	20	10	50	0.6	0.8

Table 3 depicts the values of the decision variables under three different decision-making scenarios. It is proven in the literature that the best performance of the supply chain is occurred when decisions of the supply chain are executed in a centralized scheme. As expected, the total earning of the proposed supply chain is out-performed other decision-scenarios in comparison to the centralized mechanism. The test problems are designed to analyze the applicability of the proposed mechanism in real-world application. In planning so, some data sets are applicable in extreme market conditions, for instance, data set #7 leads to infeasible solutions as there is no room for the manufacturer to cope with these intense market setting, high per unit cost *c*, low handling cost for the retailer and seemingly low wholesale price. Evident form the results, manufacturer is determining her participation ratio more alike centralized scheme in coordinated decisions as she is gaining more revenue in comparison to the decentralized decision-making scenario. This behavior is viable in all the calculated values for the manufacturer's participation factor. Moreover, this trend is in alignment with executed optimal values on equations (4), (6) and (11).

Table 3. The optimal results of the test problems

Test problem	Decision scenario	α	p	π_r	π_m	π_{sc}
#1	Decentralized	0.30	37.24	11863.45	11241.27	23104.72
	Centralized	0.44	43.18	19183.51	9761.44	28944.95
	Coordinated	0.37	40.13	12262.61	13696.88	25959.49
#2	Decentralized	0.24	50.17	6496.67	10460.38	16957.04
	Centralized	0.43	53.44	10611.65	10337.54	20949.19
	Coordinated	0.26	55.25	7294.79	11194.96	18489.75
#3	Decentralized	0.40	67.77	17979.85	6913.27	24893.12
	Centralized	0.52	58.60	13489.43	6683.87	20173.3
	Coordinated	0.49	70.77	17577.64	7988.47	25566.11
#4	Decentralized	0.53	81.39	11938.65	2167.49	14106.14
	Centralized	0.67	68.72	7415.80	1850.62	9266.42
	Coordinated	0.61	86.73	12273.91	1926.25	14200.16
#5	Decentralized	0.36	41.30	27110.39	17599.55	44709.94
	Centralized	0.46	51.83	46097.52	13579.1	59676.62
	Coordinated	0.45	44.55	27665.99	22893.16	50559.15
#6	Decentralized	0.44	53.97	21044.98	19492.99	40537.97
	Centralized	0.66	60.54	36101.05	14212.4	50313.45
	Coordinated	0.46	59.10	22529.41	23206.75	45736.17
#7	Decentralized	0.50	72.53	44091.45	4981.24	49072.68
	Centralized	0.70	64.48	38466.46	-4346.12	34120.34
	Coordinated	0.58	75.69	41577.83	7889.45	49467.27
#8	Decentralized	0.43	83.92	27145.91	9595.19	36741.1
	Centralized	0.54	73.83	19654.78	8770.92	28425.69
	Coordinated	0.53	89.55	28772.99	9188.74	37961.73

Figure 1 illustrates different retailing prices, calculated under each data-set. It is interesting how different data-sets converge in centralized decision-making scenario. Recall equations (5), (7) and (12) on the optimal values for the retailing price calculated in decentralized, centralized and coordinated schemes. Coordinated scheme tries to set the behavior of the supply chain members between most integrated and most decentralized decision-making approaches. The rapid drop in price values of the #7 test problem is noticeable on the figure. Further, on figure 2 the values of revenue functions for the data set #1 is depicted. Retailer is gaining more on centralized scenario, so there is enough motivation for him to encourage the manufacturer to switch from decentralized scenario to a more centralized decision. This middle ground is calculated through supply chain coordination mechanism. Coordinated decisions are occurring between integrated scheme and decentralized scenario.

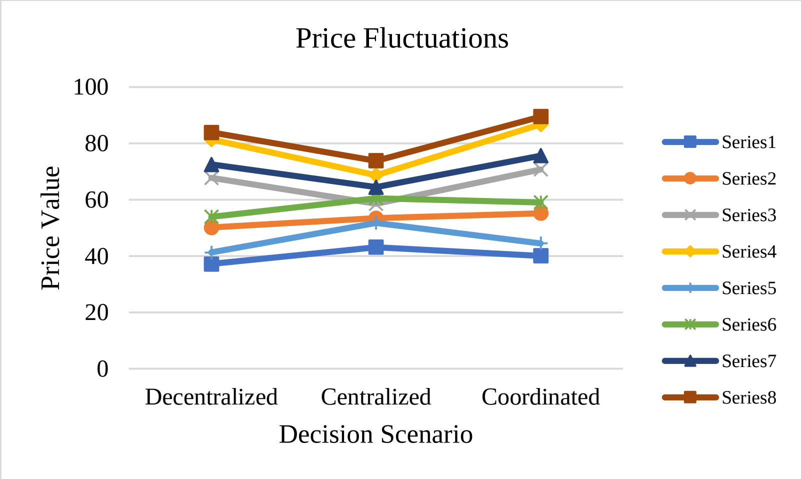

Fig 1. Price fluctuations in different test-problem data set

Recall lemma 1., and lemma 2., the results indicate under proper installation of the proposed model, not only the total earning of the retailing channel increases, each member gains more profit in comparison to the decentralized scenario. Comparing the performance of the retailing channel, retailer's cause-related marketing handling cost plays a crucial role in controlling the optimal values of the manufacturer's donation participation. Manufacturer's donation is an encouragement to the buyers to donate via her business order and this will lead to benefit both member of the proposed dyadic supply chain members.

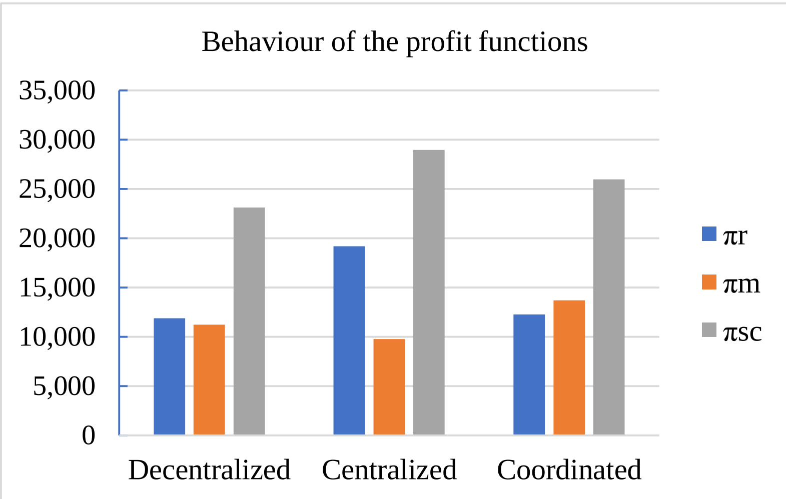

Fig 2. Comparison among revenue function values of the three decision scenarios

5-Conclusion

This study investigates a dyadic supply chain where the manufacturer is trying to achieve higher levels of revenue by activating the socially concern part of the market, whom in a conventional business order won't engage in conventional purchasing. Manufacturer is proposing a marketing scheme where buyers could actively participate in a charity donation and their payments to the charity is multiplied through manufacturer's donation plan. Similar pricing theories suggest the applications of name-your-own-price and pay-what-you-want scheme. However, in this study, existing participative pricing mechanisms are utilized to cope with the requirements of channel conflict resolution issue. After analyzing the optimal values for the decision variables in centralized and decentralized decision-making scenarios, a revenue-sharing contract is conducted to resolve the channel conflict and coordinate the decisions of the proposed supply chain members. Sensitivity analysis and results indicate the applicability of the proposed mechanism in resolving double-marginalization effect and optimizing the decision variables of the investigated problem. This study brings new approach in modeling the behavior of the demand function and focuses the corporate social responsibility practice of the manufacturer onto the potential demand market size.

Limitations on this study brings out some interesting future research possibilities. First, this study utilizes the applications of participative pricing in social responsibility practice of the manufacturer, the strategical level decisions could be investigated instead of tactical and operational decisions of the manufacturer. Other parameters of the proposed model like social sensitivity of the customers, competition among different business owners in the same market and price sensitivity coefficient could be investigated in a coordination problem scope.

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