ABSTRACT

Impact of Gray Markets on Supply Chain Performance

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Abuse of channel incentives by a manufacturer's authorized retailers often encourages gray markets to emerge which affects supply chain profit as well as manufacturer's brand image, profit loss and cannibalization of unauthorized channel sales. Often, gray marketers enjoy free rides on sales and advertisement expenditure, hence offer a competitively lower price which incentivizes consumers to buy from unauthorized channels. In this thesis, we primarily analyze three studies. In the first study, we analyze the performance of a number of contracts in the presence of a gray market- primarily wholesale price, revenue sharing and quantity discounts- and analyze their impact on prices charged, quantity ordered as well as profits. Our results indicate that selection of an appropriate contract is quite crucial, as different contracts give different results across a variety of operating parameters. Their performance is governed by the relative trade-offs involving diversion of excess quantity to the gray market at the end of the season, an extension of the target market due to lower prices in the alternate channel, and the negative impact on the manufacturer's brand which also affects its revenue. We delineate these characteristics and find that in general, the quality discount contract performs the worst. Interestingly, if the blowback suffered by the manufacturer on account of product availability in the gray market is high, the wholesale price contract may outperform the other contracts, including the revenue sharing contract with a truthful retailer, which otherwise is a more attractive option. Therefore, myopically selecting a product distribution contract can be harmful for manufacturers.

In the second study, we analyze investment in additional services as a non-pricing mechanism to cope with the gray market under different channel structures. Findings from this study sheds that the presence of the gray market has a severe negative impact on the manufacturer's profitability. The extent of profit loss is significantly influenced by the level of channel differentiation and consumer's price expectations in the gray market. The analysis also revealed that the manufacturer's loss is far severe in a decentralized supply chain while the retailer gains in terms of increased sales volume through product diversion to the gray market. In order to cope with gray markets, we propose offering additional services and analyze when such investments can be effective. We show that, while investments in additional services benefit the manufacturer when consumers have high sensitivity for service related attributes, the benefits of such investments for differentiated products are more effective (high channel differentiation) than standard products. Lastly, we discuss implications and also provide strategies to managers under a gray market environment.

In the third study, we analyze a manufacturer's strategic channel choice decision and implications for social welfare in the presence of GMs and strategic consumers. Findings show

that the manufacturer and the supply chain become worse-off due to product diversion in the GM under lower channel differentiation and high penalty cost due to loss of brand reputation. This effect is more severe for a decentralized supply chain where the product diversion is not directly affecting the retailer's profitability due to the erosion of brand reputation. In such a scenario, we suggest that the manufacturers should follow brand- protection strategy to curb the product diversion to GM. Policy makers should also act through legal mechanisms to safeguard companies selling luxury products or products involving high research and development costs. However, the manufacturer selling the product category, which has low brand-equity can follow market-expansion strategy. In such a scenario, the presence of GM provides an alternative channel to expand sales by capturing the untapped consumer segments without incurring additional market search or advertising cost and facilitates indirect price-discrimination among consumers. We find that the social welfare is higher when channel differentiation is low under the decentralized supply chain.