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Title: PROVIDING A MEASURE FOR BULLWHIP EFFECT IN A TWO-PRODUCT SUPPLY CHAIN WITH EXPONENTIAL SMOOTHING FORECASTS

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1. INTRODUCTION

Supply chain is consisting of all segments in completion of customer needs. A supply chain commonly has many echelons including of: component suppliers, main factory, wholesalers, retailers and Customers. We have three kind of flow in a typical supply chain: goods, money and information (forwarding and back warding). Coordination between various stages of supply chain is very important and taking actions with together increases total supply chain profits. Supply chain coordination indicates that each echelon of the supply chain considers influence of its actions on the other sections of the supply chain. Without coordination, many undesirable events can occur in the supply chain like exceed inventory, delay in order fulfillments and total costs of supply chain. A phenomenon, in which many researchers focus on it, is called bullwhip effect. Bullwhip effect refers conditions that order variance increases while moving from customer to main manufacturer. In this paper we provide a formula for measuring and then controlling of bullwhip effect in a two-stage supply chain in case of two-product and consequently remarkable results are explained in the next sections.

2. RELATED WORK

Amplification of demand is a major obstacle to achieve coordination and creation harmony within different stages of supply chains. Many companies have observed increasing fluctuation in orders while moving up from downstream sites to upstream sites. The result is decreasing of profitability in supply chain. After Forrester studies on demand amplification in 1958, many of researchers continued investigations on this phenomenon. In addition, a few case studies are performed in various industries around the world (like P&G, HP, Barilla) and existence of demand amplification has been proved in their supply chains. Lee et al. (1997) introduced five basic causes of this phenomenon: demand forecast updating, order batching, price fluctuation, rationing and

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