

# **Factors Influencing the Supply and Demand of OCC**

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## **Abstract**

The objective of this paper is to look at the factors surrounding the volatility of OCC markets in the United States. The use of recovered paper is related to timber supply and demand as well as the feasibility of expanded recycling programs. Recovered paper supply functions were estimated for three U.S. supply regions for inclusion into the North American Pulp and Paper Model. The price of recovered paper and landfill tipping fee's were included as explanatory variables. In general, supply was found to be inelastic with respect to price for the principal grades of recovered paper such as OCC.

**Keywords:** Economic projections, recovered paper supply, elasticity

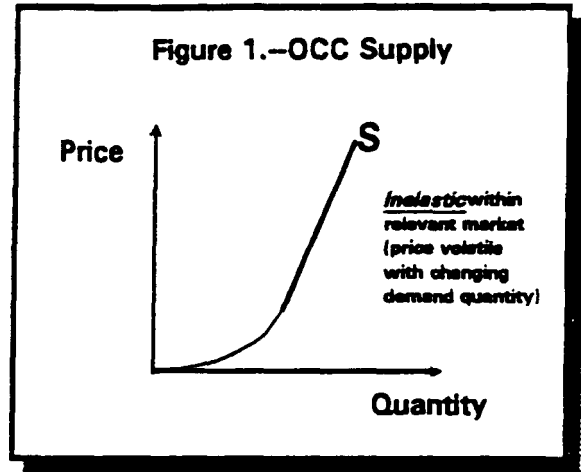
## INTRODUCTION

The United States has been landfilling an enormous and steadily rising quantity of Municipal Solid Waste (MSW) for many years. In the mid 1990's this rate of growth began to slow. In 1994, the United States recovered more than one-fifth of the nation's municipal solid waste. More than 209 million tons of such waste are generated per year, and almost 61 percent is being stored in landfills, (most of the remainder is recovered for recycling, incineration, or composting (EPA 1994)). These figures reflect a growing shift to more emphasis on waste reduction and less reliance on disposal as communities plan for the 21st century. As for individual components of MSW, paper and paperboard products continue to be the largest MSW component by weight. By landfill volume, paper is again leading other competitive components with plastics next in line. Many areas are experiencing shortfalls of permitted landfill capacity and rising landfill costs. The Environmental Protection Agency has estimated that 80 percent of permitted landfills will close within 15 years. The fees paid for disposing waste in landfills (tipping fees) rose precipitously through the 1980's, slowing in the early 1990's (NSWMA 1993).

The extensive waste management programs involving curbside sorting of waste materials and collection of materials for recycling continues to increase as landfill capacity declines. These programs were started in the early 1980's as many municipalities and local governments became increasingly concerned about declining landfill capacity and rising disposal costs. These programs continue to add to the already substantial supplies of recovered paper being collected for recycling. In the late 1980's and into the early 1990's, the increase in supply was reflected in substantially depressed prices for many grades of recovered paper. In Northeastern U.S. in particular, prices actually became negative for some grades of recovered paper, such as old newspapers. Recovered paper prices for some grades didn't turn up until early 1994 and remained strong into 1995. In 1995, OCC prices declined to low levels experienced prior to 1990 and have remained flat into 1996.

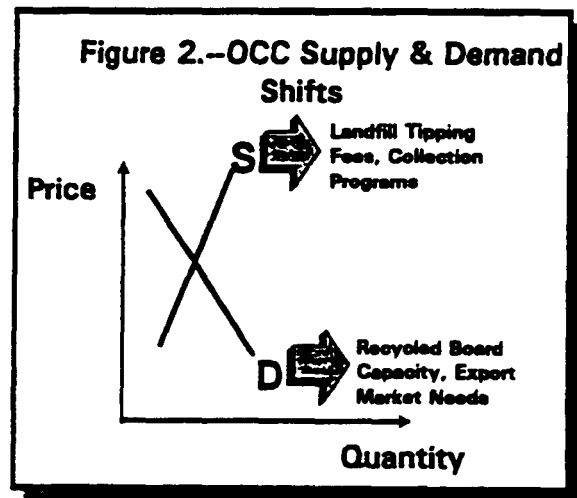
How long recovered paper prices remain strong and to what extent recovered paper supplies will continue to increase in the future are issues that are related to timber supply and demand as well as the feasibility of expanded recycling programs. These are complex supply and demand issues, requiring consideration of

technological changes in the pulp and paper sector and development of regional markets over time. To examine these issues, the USDA Forest Service and Forestry Canada developed the North American Pulp and Paper (NAPAP) model. As part of the development of the NAPAP model, estimates were made of recovered paper supply functions for the four principal grades of recovered paper (old newspapers, old corrugated containers, mixed wastepaper, and the combined category of pulp substitutes and high-grade deinking wastepaper). These estimates show the price of OCC to be inelastic (Figure 1), meaning that large supply increases doesn't result from small price changes.



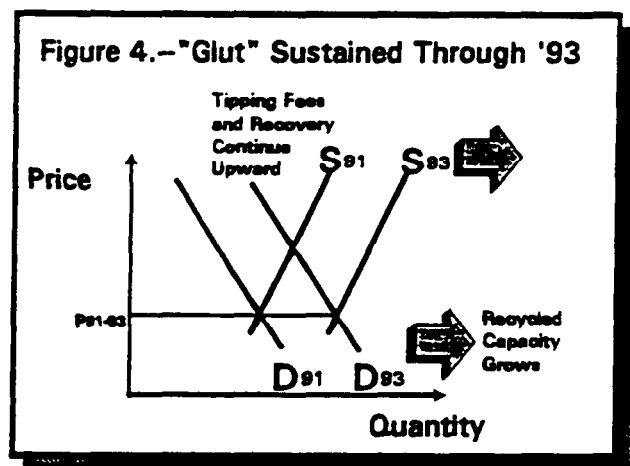
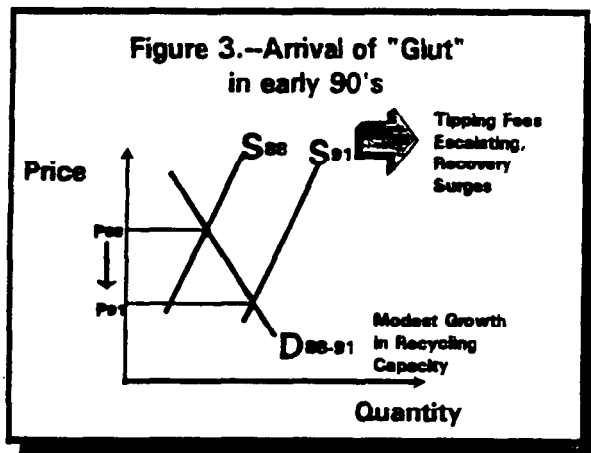
### PRICE DETERMINATION

The North American Pulp and paper industry has dramatically increased its use of recycled fiber over the last decade. The use of OCC as well as the other components of recovered paper is determined by regional market economics. The prices for recovered paper have shown great volatility since the mid-1980's. The price for OCC during the 1980's varied between \$25 and \$75 per ton as determined by business conditions for containerboard. The demand to recycle recovered paper varies with the strength or weakness of the overall U.S. economy and population growth, tending to fluctuate more widely than changes in economic activity. The demand for recovered paper is directly affected by the demand for recycled paper and paperboard products (Figure 2). As recycled board



capacity increases and export markets expand, domestic demand tends to increase. This is reflected in the increase of tipping fees and collection programs. Changes in the use of these products can result either in an under or over supply of waste paper.

In periods of economic expansion, the demand for recycled products is frequently greater than the readily available supply of recovered paper. This is because the supply of recovered paper is limited to the number of existing collection programs. It takes time to organize additional collection systems for increasing the supply of recovered paper. Conversely, in periods of economic recession the demand for recovered paper products declines and correspondingly the demand for recovered paper also declines. When this occurs, the collection programs are generating a supply of recovered paper that exceeds the requirements of recycling mills. This results in a glut of recovered paper such as that which occurred in the early 1990's (Figure 3). This



glut was sustained through 1993 as tipping fees and recovery continued upward. Recycled capacity continued to grow throughout this time period also (Figure 4). During the last quarter of 1994, the general slowdown in business depressed the demand for recovered paper at recycling mills. This depressed demand was a leading cause of falling OCC prices domestically. As the economy improves, so does the production at recycling mills and the demand for recovered paper.

## DEMAND SECTORS

The largest single source of recovered paper used for recycling is corrugated boxes and corrugated box plant dippings. They amounted to 28.4 million tons in 1994, of which about 2.6 million tons were box plant clippings and the remaining 25.8 million tons were used corrugated boxes.

The paperboard segment of the industry is where recycling of recoverable paper has both its greatest volume and its most significant opportunity to expand. Paperboard is used largely for packaging where structural strength of boxes and cartons is their most important physical property. Paperboard production is divided into three main categories: Containerboard for corrugated and solid fiber boxes; Bleached Paperboard for conversion into packages such as milk cartons, frozen food cartons, containers for moist liquid and oily foods, and Recycled Paperboard used to make folding and set-up cartons. Total paperboard production was 46.6 million tons in 1995. About 15.7 million tons of corrugated boxes was recovered for use as a raw material. This represents 55 percent of corrugated box generation that was recovered for recycling. The 15.7 million tons recovered for reuse represents 42 percent of the 37.8 million tons of containers and packaging in MSW.

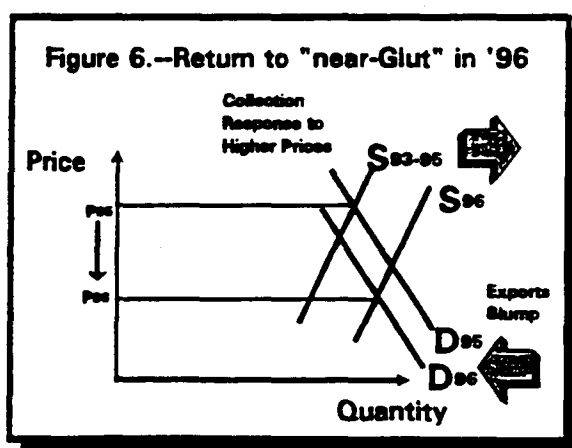
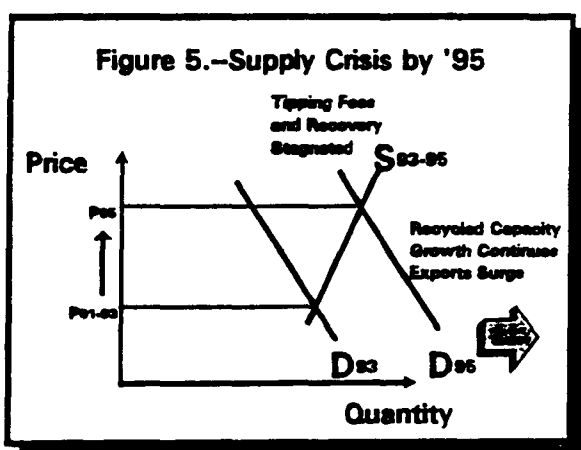
Containerboard is the paperboard converted into corrugated and solid fiber boxes. Linerboard, another component of containerboard is the two outer facings and corrugating medium is the fluted inner ply of a corrugated box. In 1995, a total of 28.7 million tons of containerboard were produced in the U.S.. Of the 28.7 million tons of containerboard produced domestically, 19.7 million tons was linerboard. Domestic linerboard production consisted mainly of Kraft linerboard. Of the 19.7 million tons of linerboard production 17.8 million tons was kraft white recycled board production in 1994 stood at 1.9 million tons.

Corrugating medium, another containerboard component is made from two major grades. In 1995, about 9.0 million tons of corrugated medium was produced. Semicheical medium production, a combination of primary and recycled fibers was 5.5 million tons and recycled medium production was 3.5 million tons. When the demand for containerboard products increases which could result from a general economic expansion domestically or overseas, upward price pressure is exerted for OCC due to declining supplies and the availability of inventories.

## FUTURE DEMAND SHIFTS

The containerboard industry domestically and overseas should see an upturn as new capacity comes on line. The majority of the new capacity added globally over the next two years, about 80 percent, will be recycled containerboard, meaning we should see OCC fiber use increase. Demand for OCC should rise over this period as the new capacity comes on line. OCC prices should also increase as a result of this increased demand. OCC recovery from the waste stream in the U.S. is nearing maximum recovery rates that was estimated at 63 percent in 1994. United States recycled containerboard producers will have to continue to compete with overseas buyers as overseas buyers continue to demand the high quality U.S. product.

OCC exports from the U.S. averaged about 2.5 million tons per year from 1988 to 1993. In 1994 exports surged 38 percent from 1993 levels while during this time OCC prices were rising to new levels. OCC exports rose another 26 percent in 1995. During 1995 the country was experiencing a raw material supply crisis as tipping fees and recovery of recovered paper peaked and began to stagnate. Recycled capacity and exports of OCC was surging causing price increases in 1995 (Figure 5). During the last quarter of 1995 domestic and overseas markets began to slump. Along with softening export demand, OCC prices fell to a low of \$40 per ton during December 1995 and have remained low during 1996 as the U.S. returned to a near glut for recovered paper and OCC (Figure 6). But with new capacity geared to start up in 1997, upward price pressures from increased demand domestically and overseas should be realized during 1997.



## SUMMARY

OCC prices as influenced by overseas demand along with raw material prices are key variables in making determinations of market swings. Tipping fees have also been found to be a key indicator of market swings because of the strong influence on curbside collection programs. The arrival of a glut for recovered paper occurred in the early 1990's spurred by escalating tipping fees. Recovered paper prices including OCC price declined during this period as shown in (Figure 3). This glut was sustained through 1993 as tipping fees and recovery continued upward (Figure 4). The market began to stagnate in 1995 as a result of an oversupply of recovered raw material. This was evidenced by the decline in OCC price to below \$50 per ton, after reaching over \$200 per ton in May of 1995 due to a short-lived export surge. Tipping fees and recovery also stagnated during the latter half of 1995 (Figure 5). Another market development occurring late 1995 was the growth in recycled capacity as well as a resurgence in exports. Although the market was starting to stagnate prices were increasing due to an increase in export demand. During 1996 the market returned to a glut condition as collection responded to higher prices and exports slumped resulting in lower prices for OCC.

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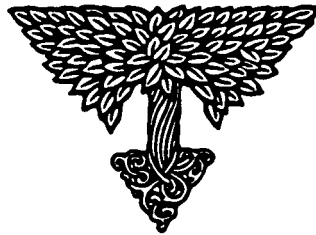
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