



A BETTER MARKET MECHANISM?

Three researchers argue that the current system of trading recycled materials has led to inconsistencies in material quality and excessive price fluctuation. They note a centralized exchange for futures trading would benefit processors, cities and end users.

By Jordan P. Howell, Jordan Moore and Daniel Folkinshteyn

How can we increase recycling efficiency across the board?

Considerable time, energy and money have been expended on recycling in New Jersey (our home state) and in many places around the world. Recycling can prevent huge volumes of material from heading to landfills and incinerators. Yet, for decades, the realities of municipal and commercial recycling in the U.S. have not lived up to the promise of finding new value for old materials.

Consider the following: The U.S. EPA has reported that 48.2% of the 292.4 million tons of municipal solid waste generated in the U.S. in 2018 was recyclable: paper (23.05%), plastic (12.20%), metal (8.76%), or glass (4.19%). But only about 69 million tons of material were actually recycled that same year, 48.9% of the total eligible material. This included 45.95 million tons of paper (68.18% of paper disposed), 3.02 million tons of plastic (8.47% of plastic disposed), 8.71 million tons of metals (34.00% of metals disposed),

and 3.06 million tons of glass (24.98% of glass disposed).

In other words, about half of the material that could be recycled ends up in a landfill, incinerator or illegal dump site.

At the same time, many large buyers of recyclables complain that they are unable to secure an adequate supply for their manufacturing processes. For instance, both Coca-Cola and PepsiCo – two of the largest companies on the planet – have committed to increasing recycled content of their bottles in the coming years, but the brand owners have pointed out the tremendous difficulties they have had in securing adequate supplies of recycled plastic.

Even as the overall volume of waste has increased, the amount actually recycled has remained stagnant for some time. Plenty of research has rightly focused on the engineering and materials science dimensions of the problems facing recycling. However, it's also critical to acknowledge that, at least to some degree, our recycling failures are rooted in the marketplace used for materials exchange.

RELYING ON INFORMAL NETWORKS

The supply chain that moves post-consumer recyclables from collection points to processors to end users making new products is different from the typical supply chain for other commodity materials.

Most other commodities are traded on centralized markets with fairly transparent mechanisms for reporting prices and volumes. In addition, post-consumer recyclables feature many of the same attributes as other commodity materials, like cyclical pricing and substitutability. But recycled materials are typically traded “over-the-counter” through the personal and professional networks of processors, brokers, buyers and sellers.

As most readers are well aware, many careers in the waste management industry have been made – and lost – over the ability to move material volumes. And there is no shortage of illustrations of the dumping, warehousing, incineration and landfilling schemes that have been hatched to gloss over periodic market collapses, both in New Jersey and elsewhere. (See the soon-to-be released book “Garbage in the Garden State,” published by Rutgers University Press and written by Jordan P. Howell, for much more detail about the history of waste and recycling in New Jersey.)

The recycling business has also suffered from quality and contamination issues; there are many stories about unscrupulous vendors mixing different grades of material, or even marketing trash as recycling loads.

The considerable volatility in prices, availability and quality of post-consumer materials make these products much more difficult to

work with from the perspectives of large industrial users. These users instead turn to virgin materials while recyclables head to landfills or incinerators.

Efforts to reform markets for recycled materials and improve related infrastructure must focus on smoothing out these variabilities as much as possible if recycling is to achieve its maximum economic and ecological potential.

DAWN OF DERIVATIVES

To help address imbalance in the marketplace, we propose the creation of financial derivatives (futures contracts, in particular) for buying and selling post-consumer recyclables, as well as a marketplace for their exchange.

At the most basic level, a derivative is a contract that derives its value from fluctuations of an underlying entity (this entity could be a stock, commodity, currency or interest rate, for instance).

Historically, listing exchange-traded derivatives has improved the market quality of the underlying asset across a range of asset classes, including equities, stock market indices, commodities and currencies. Our research suggests that these effects would also positively impact the marketplace for recycled materials.

In our project, we analyzed pricing for a large data set of 13 different recycled materials. The information was collected from recyclingmarkets.net, a service that tracks the value of recyclables being sold by materials recovery facilities and other recycling centers in different areas of the country. The list of 13 included different types of plastic, glass, paper fiber and aluminum.



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Not surprisingly, we found that the price volatility of recycled materials is high overall and actually excessive compared with the price volatility of analogous new materials. For example, the standard deviation of monthly returns is more than 32 times larger for recycled paper than virgin paper and more than seven times larger for recycled glass than virgin glass.

Controlling volatility in prices could result in greater clarity for financial planning and capital investment.

Our analysis suggests potential economic benefits to listing exchange-traded futures on recycled materials. We show that volatility in post-consumer recyclable prices explains 12% of the market-adjusted volatility in the stock prices of publicly traded waste management firms. Given that revenues for these firms depend at least in part on markets for buying and selling recycled materials, it's clear that controlling volatility in prices could result in greater clarity for financial planning and capital investment.

We suggest specifications for these new financial contracts based on standards published by prominent waste industry associations such as the Institute for Scrap Recycling Industries, key regulators, and commodity derivatives exchanges themselves (the Chicago Mercantile Exchange, for example).

STEPS TOWARD STANDARDIZATION

Trading recycled material derivatives through a centralized market provides a number of benefits. In this structure, problems of variability in quantity and quality that have plagued markets for materials for decades could be overcome. Assuming a world where the vast majority of post-consumer material is traded through futures contracts, there would be tremendous standardization in volume, quality, contamination level and so forth, all specified in the language of the contract, as is the case with other commodities. This reality would foster greater consistency in material streams.

Meanwhile, MRFs, brokers and other market participants not abiding by the terms of the contract would quickly be found out and excluded from the industry, or else clean up their compliance and return to the marketplace. Consistency in the materials stream, along with the potential for reduced price volatility, should be encouraging to any entity that is participating in the recycling industry and also attractive to firms considering making additional capital investments.

In addition to the benefits of reducing price volatility, raising standards for quality, and improving transaction transparency, over time an active market for recycled material derivatives will clarify which materials are recyclable in practice and which materials are recyclable in name or concept only.

For instance, we can imagine a scenario where the futures market for certain grades of plastic is highly liquid – indicating strong interest in procuring these materials for some particular use – while the market for other grades of plastic has no activity whatsoever. In this scenario, the market is sending a signal that the inactive grade of plastic is not truly recyclable: While the chemistry of the plastic

may make it feasible for recycling, there is no real demand to use it in that way.

Furthermore, municipalities in this example could use market information to determine the specific constellation of materials that they actually collect, more confident that there is a market for their sale and subsequent reuse. Similarly, haulers both public and private could justify the exclusion of certain grades of material

from the waste stream. And regulators and environmentalists would take note and demand that the type of plastic be excluded from lists of recyclable materials.

Ultimately, packaging manufacturers might focus attention on other grades of plastic that have a stronger secondary market, rewarding firms for using materials that are actively traded and discouraging use of materials that have no real secondary market. Certain materials might come back into fashion for packaging purposes while others would fade out.

WORTHWHILE COMPLICATIONS

Clearly, moving from the existing model for trading post-consumer recyclables to a centralized market model would be a considerable logistical challenge. Getting contracts listed on exchanges involves navigating all sorts of regulatory requirements. Equally significant, trading materials in this fashion would represent a culture shift for the industry, and it would take time to secure buy-in from industry participants.

But in the long run, we think that the benefits of trading recycled materials with exchange-traded derivatives will outweigh the costs for industry firms and also help fulfill the ecological potential of the recycling industry. ^{RR}

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