

Plastic Turkey: International Leakages of China's Waste Contamination Policy

Oxford professor Banu Demir came to Paris in December 2023 to present her work at the Paris Trade seminar and to interact with the international trade researchers and PhD students. The Globalization Chair team spent some moments with her to discuss the topic of her paper, namely international trade flows of plastic waste and China's recent decision to ban imports of plastic waste. Her paper is co-authored with Deniz Atalar and Swati Dhingra.

Dear Banu, we usually think of international trade flows in terms of the goods we buy that have to be transported from the place of production, which is often a long way away. We rarely think of trade flows in terms of goods that have already been used and are travelling to be recycled. Used plastic products, for example, are traded as plastic waste. Your study shows that these flows are huge and that their nature has changed over time. Can you tell us more?

Trade flows of plastic waste can be traced back to the 1950s using UN Comtrade data. A specific category of the trade nomenclature includes plastic waste at a very detailed

8-digit level, distinguishing between ethylene polymer waste (used for plastic bags), styrene polymers (used for CD packaging, among other things), propylene polymers (highly heat-resistant, used for medical purposes, for example) and other plastics.

Plastic waste comes from countries that consume plastic products (such as juice bottle packaging) or manufacture other products (such as vaccines, which we will use in our illustration below), both of which produce plastic waste, either directly or as by-products. Plastic waste is then either stockpiled in landfill sites, burnt or sorted for sale at home or abroad: hence the trade flows in very detailed

categories of plastic waste. Buyers of plastic waste are domestic or foreign companies that specialize in waste management or manufacture a different product after carrying out the shredding, treatment and reuse process in-house.

In our study, we show that Turkish companies purchase plastic waste for use in their production process. We show that they used to buy domestic plastic waste and switched to imported plastic waste when the price of imported varieties of plastic waste fell on world markets following a change in policy in China.

Today, individuals, businesses and governments are more aware than ever of the need to deal with the waste generated by consumption and production. Can you describe how the plastic waste treatment process works and explain how waste ends up being traded internationally instead of being recycled where it is generated?

Around the world, the vast majority of plastic waste goes untreated and is simply disposed of in landfill sites or in the environment. The problem is that untreated waste degrades the environment through ocean pollution and methane pollution from landfills. A very small percentage of plastic waste is recycled (9%) or incinerated. The boom in international trade in plastic waste is explained by the tightening of environmental standards in several developed countries, which has made the collection, sorting and treatment process much more demanding and costly. What's more, recycling can only be carried out on certain types of polymer. Faced with growing concerns about environmental damage, developed countries have considered exporting their plastic waste for recycling abroad. As a result, trade flows of plastic waste from developed to developing countries increased, leading to the introduction of regulations such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, signed in 1989, which

dealt specifically with trade flows such as plastic waste.

The Basel Convention is the first step towards international regulation of trade flows based on the "not in my backyard" principle, whereby countries prefer to send their waste elsewhere when domestic treatment and recycling solutions are not available. The Basel Convention came into force in 1992, obliging countries to adopt key principles for environmentally sound waste management. What China announced in 2017 about its waste management industry is much more extreme. Can you tell us more about this event?

In 1989, 34 countries signed the Basel Convention, which restricts trade in waste, particularly in low-income countries. However, the convention did not significantly reduce plastic waste flows, as not all types of plastic were covered, and the United States did not sign it. Global trade in plastic waste continued to grow between 1993 and 2016. China, in particular, has become a major destination for the export of recyclable materials, such as plastics. In 2016, China imported 56% of the world's plastic waste. China became the main destination for plastic waste because it could recycle large quantities of plastic waste without being subject to strict environmental regulations. China also made extensive use of plastic waste

for other production purposes.

In 2013, health concerns grew in China, especially after a major winter haze. The country tightened a number of air pollution regulations and issued permits and set targets for activities emitting volatile organic compounds. Among other decisions, from 2017 China has only authorized imports of waste that meets very strict contamination criteria. This policy, dubbed "Operation One Sword" (ONS), has led to a collapse in waste imports into China.

As a trade economist, you are used to studying the effects of trade frictions on international trade flows and on the well-being of countries. What effects did you expect to find before starting to analyze the impact of the Chinese ban on international trade?

We looked at the trade diversion effects and environmental consequences of increased imports of plastic waste in countries that were not previously major users of imported waste. A prohibitive tariff (an import ban) imposed by an importing country has the effect of redirecting trade flows to other countries. Furthermore, the pollution haven hypothesis in economics stipulates that stricter environmental regulations in one country lead to the relocation of the production of the polluting activity to other countries with less stringent

environmental policies. This is precisely what we examine in the first part of our analysis.

We study the evolution and direction of global trade flows of plastic waste following the ban in China. We show that existing plastic waste exporters subject to the ONS policy reduced their exports to China by 16% after 2017, but did not reduce their exports overall. These exporters diverted their exports to other destination countries, including Turkey, Malaysia and Thailand. Turkey has become one of the main destinations for plastic waste exports from developed countries. In the second part of our article, we focus our

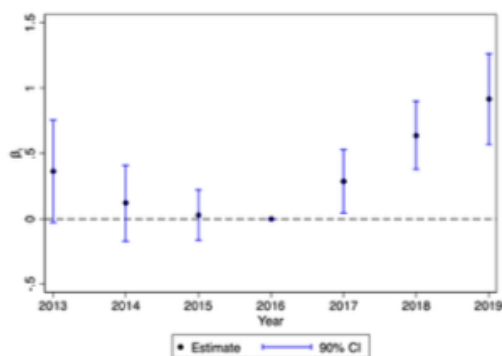
analysis on the effects of this increase in plastic imports into Turkey.

Your paper shows that Turkey has become a major importer of plastic waste from more advanced economies.

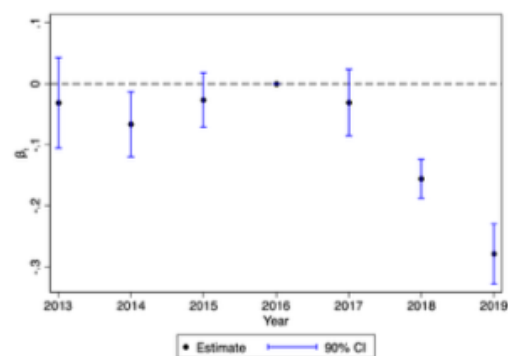
The ONS policy led to a sudden oversupply of plastic waste on global markets, resulting in lower global prices for this type of waste. Turkish customs data shows that companies started importing more of the waste banned by China after 2017, at lower prices. The figures below (Figure 1.) show the annual increase in quantities and the fall in import prices.

Turkish imports of cheaper products banned by the Chinese government in 2017 increased and remained high until 2019. Turkish manufacturing companies used this plastic waste as inputs into their production process, probably after shredding and processing the waste before reusing it. The fact that we did not observe any re-export of the same products confirms that the imported plastic waste banned by China remained in Turkey and began to be used domestically as cheaper inputs.

Figure 1.
Event Study: Decomposition of Turkish imports



(A) Quantity



(B) Unit prices

Tell us about the database you use to analyze the development of plastic waste management in Turkey. Are you able to establish a link between the ban on plastic waste in China and changes in pollution levels in Turkey?

We have access to micro-level datasets from Turkey that allow us to analyze the impact of China's ban on plastic waste imports on Turkish firms' imports of plastic waste and their subsequent use of these products. In particular,

we rely on the Manufacturing Waste Statistics Survey, which is a firm-level survey of a representative sample of firms examining their annual waste generation and disposal methods.

The story we are investigating can be summarized by the following image (Figure 2.) showing a map of Turkey: Turkish manufacturers of plastic cones, for example, used to buy plastic waste from domestic suppliers (here a Turkish vaccine manufacturer,

which produces plastic waste as a by-product). After the Chinese ban, companies began importing plastic waste from abroad (for example, from the UK, as shown here). Waste sold in the country decreased, leaving Turkish producers of plastic waste (as

by-products) with very few alternatives for using their waste. These Turkish producers end up mismanaging their waste: the plastic waste produced in Turkey is neither recycled, nor incinerated, nor stored in sealed landfill sites.

Figure 2.
Illustration of plastic waste flows



What are your conclusions on the overall effect of China's unilateral ban on plastic waste imports?

Ultimately, our results show that China's ONS policy has two opposing effects. On the one hand, the increase in cheaper plastic waste available on world markets has benefited

Turkish manufacturers: we observe an increase in their sales following the Chinese ban. On the other hand, domestic plastic waste is more often poorly managed and therefore not sold for proper recycling and reuse. This leads to obvious pollution problems. We are developing a theoretical model to analyze the overall

effects of such a compromise at national level. We will soon be able to use simulations to assess the trade-off between environmentally harmful emissions in Turkey and a reduction in global emissions due to the allocation of resources after the Chinese ban.

This interview was conducted by Pamina Koenig, affiliate researcher at the Paris School of Economics and professor at the University Paris 1 Pantheon-Sorbonne.

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