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What contributes to the U.S. Infant formula shortage
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Abstract

Starting in 2022, the United States experienced an unprecedented shortage of infant formula. The shortage is not just a supply chain issue, but also because Abbott, the largest supplier of powdered milk in the United States, recalled several faulty formulas and closed its plant in Michigan. Thousands of families are scouring supermarkets and pharmacies for infant formula. With out-of-stock rates on the rise. Some parents don't care about FDA rules and try to circumvent regulations by ordering formula from Europe through third-party suppliers. However, U.S. Customs agents have been known to seize shipments at the border. Some companies monopolized the entire infant formula industry, state contracts lead to reliance on a single supplier and U.S. imposes high taxes on imported infant formula are all contributed to this shortage.

1. Introduction

Infant formula is a very sensitive and important product, it include a variety of nutrients such as proteins, vitamins, carbohydrates, fats, linoleic acid and probiotics that contribute to an infant's overall development (Raju Kale and Roshan Deshmukh 2022). Since 2022, there has been an acute shortage of infant formula occurred in the USA. This is alarming because only a quarter of children in the United States are breastfed, and the vast majority of infants rely partially or exclusively on infant formula for their nutrition. Between September 2021 and January 2022, there have been four infants Four infants infected with *Campylobacter sakazakii* or *Salmonella*, two of them died. In response, the U.S. Food and Drug Administration launched an investigation. The manufacturer involved, Abbott Nutrition, the largest supplier of baby formula in the USA, voluntarily recalled the suspected formula in February and closed its plant in Michigan, causing a further shortage of infant formula on the market. U.S. parents and caregivers have been struggling with a dwindling supply of infant formula, which has been particularly hard to come by, with some retailers even imposing limits on how much can be purchased

This paper consists of three parts, The first part will introduce the current out-of-stock status of infant formula. The second part will focus on the analysis of the causes of the shortage of infant formula, including some companies that have monopolized the entire industry, WIC

leads to dependence on a single supplier and import barriers. The third part will introduce some relevant recommendations to prevent the recurrence of similar incidents.

1.1 Timeline for this event:

February 2022: Abbott announces a voluntary recall and Abbott plant was shut down after the hospitalization of two infants and the deaths of two others may have been linked to its contaminated formula, triggering an investigation by the FDA and CDC. The investigation found bacteria at its plant and a leaky roof and cracks in key equipment.

May 2022: With more than 40 percent of infant formula out of stock in the United States, many merchants such as Walmart, target, CVS, Walgreens, began limiting the amount of formula customers could purchase. In response to this emergency, President Biden invoked the Defense Production Act to require manufacturers of ingredients used in formula to give priority to orders from formula manufacturers over others.

June 2022: Because of severe storms and flooding across the state, the same Abbott formula manufacturing plant in Michigan has been shut down again, which has led to a 22.4% out-of-stock rate of milk powder on store shelves.

July 2022: The Abbott plant reopened and resumed production on July 1. The company had earlier said it would take six to eight weeks from reopening to product on the shelves.

1.2 Baby Formula Out of Stock Trends:

Despite several measures taken by the U.S. government to address the crisis, such as speeding up production by domestic manufacturers and easing trade barriers has made it easier for foreign formula to enter the United States. The Biden administration even transported milk powder from Europe to the U.S. via military aircraft on the same day to address the infant formula scare, the shortage of formula continues in many states.

a. Nationwide Trends

Nationwide baby formula shortage reaches 43%

Data for week ending May 8

— Average weekly out-of-stock rate



Source: [Datassembly](#)

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- For the first 7 months of 2021, average weekly out of stock rate is relatively stable and fluctuated between 2% and 8%
- After July, the out-of-stock rate reaches more than 10%, then starts to rise significantly in November 2021, reaching an unprecedented 43% by May 2022. About 10% higher than the April average and 32 % higher than last November's average
- Meanwhile, U.S. infant formula prices are increasing, with the average price having risen 18% compared to the same period last year

b. State Trends

States with the Least Formula

For week ended July 3

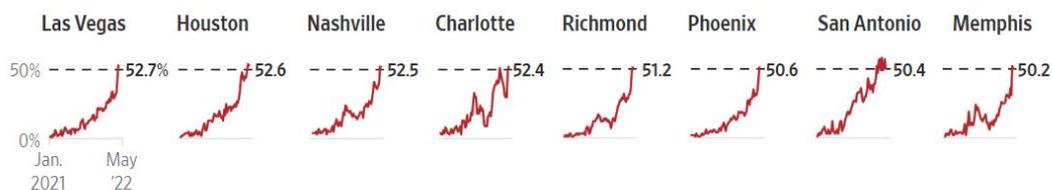
State	In-Stock Rate
Alaska	51.31%
Utah	56.68%
Wyoming	56.87%
Kansas	58.78%
Colorado	59.80%
Minnesota	60.04%
Wisconsin	62.04%
Montana	62.30%
Kentucky	65.02%
Idaho	65.49%

Source: IRI Worldwide

Utah, Wyoming, Kansas and Colorado were the hardest hit states with inventory levels below 60%, Alaska had the largest shortfall with only 51.31% of its inventory(Martine Paris 2022).

c. Metro Area Trends

Metro areas with at least 50% out of stock as of May 1
Baby formula, weekly out of stock



Source: Datasembly

For the week of May 1, there were 8 major metro areas that had out of stock higher than 50% - Las Vegas, Houston, Nashville, Charlotte, Richmond, Phoenix, San Antonio, Memphis.

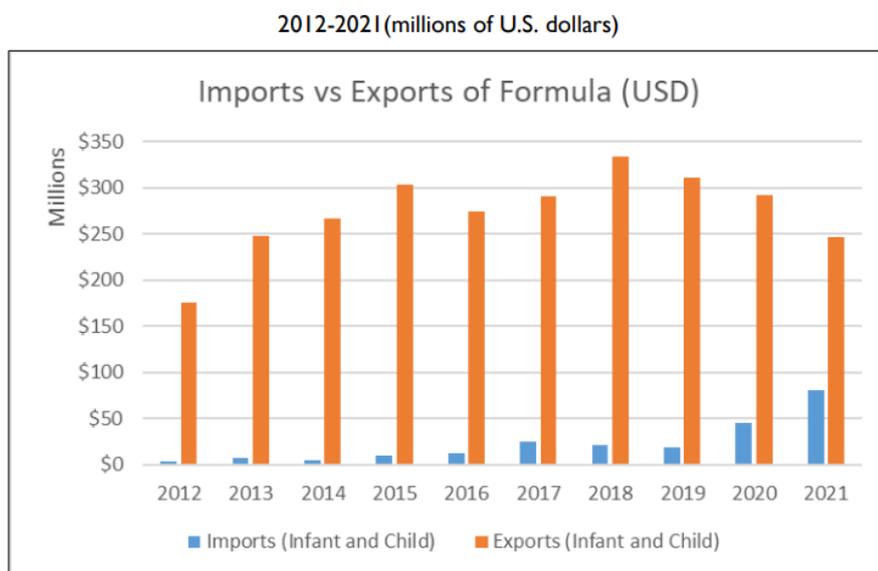
2. Causes of infant formula shortage

2.1 Industry Monopoly

The infant formula industry is Big Business. The United States is one of the largest markets for infant formula in the world. According to the report published by Allied Market Research, the U.S. baby infant formula market was accounted for \$3.88 billion in 2020 and is expected to hit \$6.78 billion by 2030, registering a CAGR of 8.6% from 2021 to 2030. The growth of the U.S. infant formula market is mainly attributed to the high nutritional content of infant formula and the increase in the number of women participating in the labor force. In addition, the increased health awareness among US consumers has also boosted the demand for infant formula (Raju Kale, Roshan Deshmukh 2022).

From 2012 to 2021, the average demand of infant formula is approximately \$2 billion annually, the companies in U.S. produced an estimated average 524 million kilograms, which results in an average annual surplus of \$300 million. During this period, the United States exported an average of 33.5 million kilograms (\$277.1) (Christopher A. Casey, 2022). The U.S. milk powder market is already highly saturated. Under normal circumstances, there is enough domestically produced formula in the U.S. to meet demand, but this shortage has revealed how serious the problem is, and parents have no other choice.

Imports and Exports of Formula (Infant and Young Child)



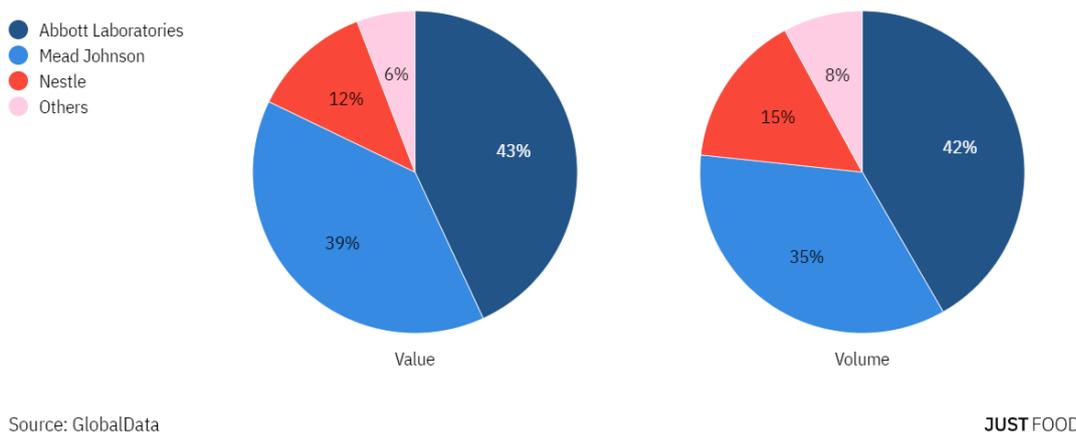
Source: U.S. Census Bureau.

Notes: U.S. export data is not as granular as the import data and it is difficult to disaggregate infant from child formula in export numbers. However, surveys conducted by CRS of imports of U.S.-made formula in other national statistics suggests that most U.S. exports are of infant formula.

In the United States, the infant formula market is monopolized by four companies - Abbott Nutrition, Mead Johnson Nutrition, Nestle USA and Perrigo Company, they account for 90% of the U.S. supply of infant formula. According to a report released by the U.S. Department of

Agriculture in 2011, Abbott had about 43 percent of the national market share 10 years ago, and that share has barely changed since then to the present. With Abbott the largest formula manufacturer in the US, the shutdown and voluntary recall of potentially affected products left empty shelves. Concentration in the infant formula market has contributed to the current crisis, exacerbating product shortages and hindering rapid market adjustments.

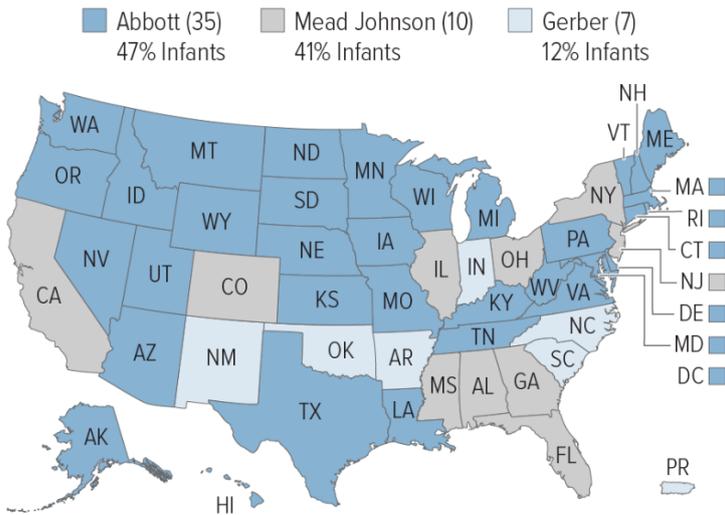
Market share of leading companies, 2020



2.2 The Role of WIC in the Formula Shortage

USDA's Special Supplemental Nutrition Program for Women, Infants, and Children which is also known as WIC, is a program developed by the US federal government in order to provide nutritious foods, including milk, grains, fruits and vegetables, to low-income pregnant and postpartum women, infants and children under 5 years of age. WIC uses a competitive bidding process in which infant formula manufacturers offer substantial discounts to the states WIC in order to be the sole formula supplier to WIC. WIC participants redeem the "WIC vouchers" they receive for infant formula at "WIC participating retailers". The vouchers specify the types of food products that can be purchased. WIC then reimburses the retailer at the contracted price and the manufacturer rebates WIC the discount specified in their contract (Yoon Y. Choi et al. 2022). Guaranteed sales of WIC allow retailers to give contract winners prominent shelf space and product placement, and widespread use of WIC may increase physician referrals to contract brands. When a manufacturer gains a WIC contract in a state, it can boost sales of its products among NON-WIC consumers, and conversely when a manufacturer loses a WIC contract, its market share in NON-WIC areas drops dramatically. WIC accounts for about half of all infant formula sales in the U.S. It is the largest purchaser of infant formula in the United States. Abbott, Mead Johnson and Gerber are the three approved suppliers of WIC. Among them, Abbott is the largest supplier to this program, which provides roughly 47% of the market share. The Abbott recall and resulting shortages are particularly devastating for WIC beneficiaries. Many of these families do not have the time or other commensurate resources to find an alternative formula. Even if they are able to find alternative formulas, they unexpectedly pay a higher price than usual because WIC benefits will likely not cover these specific brands found in times of shortage.

Three Manufacturers Supply WIC Infant Formula



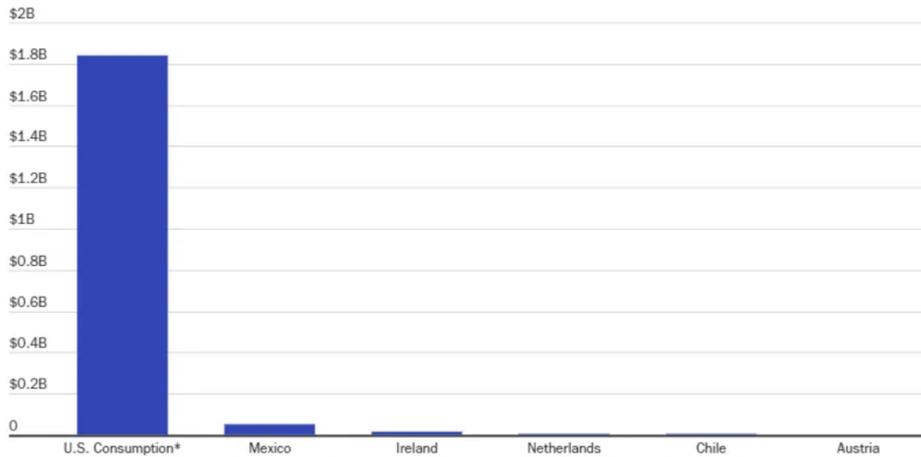
Note: Contract status as of May 2022. Share of infants by manufacturer in legend refers to the infants participating in WIC in the 50 states, D.C., U.S. Territories, and Indian tribal organizations that have contracts with that manufacturer.
 Source: U.S. Department of Agriculture administrative data

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2.3 Import Barriers

U.S. trade and regulatory policies are another important reason for the shortage of infant formula. Relative to domestic production and consumption, few infant formulas are imported into the United States. According to U.S. government and IBIS World figures, although Mexico is the largest source of U.S. import of children’s formula (98% imported in 2021), infant formula accounts for only a small part of the total import from Mexico (only 0.4%).

Top 5 U.S. import sources for baby formula compared to U.S. consumption in 2021.



(Source: IBISWorld/Cato Institute)

From table 1, Ireland, Chile and Netherlands are the three main sources of infant formula imported into the United States in 2021, they account for 93% of all infant formula imports. Among them, Ireland is the largest source (23 million kilograms, 17.2million), followed by Chile (1.2 million kilograms, 3.2 million) and Netherlands (0.5 million kilograms, 7.1 million).

But they still represent a very low percentage compared to the entire U.S. infant formula market.

Table 1. Sources of Imports of Infant Formula in 2021

Country	Quantity of Imports (kilograms)	Value of Imports (U.S. Dollars)	Average Cost per Kilogram (U.S. Dollars)
Ireland	2,297,934 kg	\$17,191,723	\$7.48
Chile	1,179,763 kg	\$3,296,057	\$2.79
Netherlands	551,802 kg	\$7,092,049	\$12.85
Brazil	183,171 kg	\$325,245	\$1.78
Venezuela	43,143 kg	\$110,104	\$2.55
Serbia	36,486 kg	\$35,272	\$0.97
Mexico	18,377 kg	\$514,488	\$28.00
Australia	8,244 kg	\$230,838	\$28.00
Greece	1,620 kg	\$15,034	\$9.28
Denmark	518 kg	\$6,728	\$12.99
El Salvador	480 kg	\$6,000	\$12.50
United Kingdom	9 kg	\$2,223	\$247.00
Sum	4,321,547 kg	\$28,825,761	\$6.67 (average)

Source: U.S. Census Bureau.

Notes: Infant formula only. See shaded box for HTSUS codes.

First of all, federal policy is the biggest obstacle for foreign manufacturers to enter the United States. Depending on the content, the U.S. imposes up to 17.5 high tariffs on imported infant formula (Gabriella Beaumont-Smith 2022). Formular is also subject to a mechanism known as a tariff rate quota, where additional duties will be levied if the quantity exceeds a certain amount. Provisions of the USMCA restrict Canadian exports of infant formula anywhere in the world, not just to the United States, because a Chinese manufacturer invested in an infant formula plant in Ontario and the products they produce may enter the U.S. market. At now, if Canadian companies collectively export more than 40,480 metric tons, they will be charged an export fee of \$4.25 (Canadian dollars) per kilogram. In fact that the United States did not import any infant formula from Canada in 2021, however, tons of domestic formula was exported to Canada (Eric Kulisch 2022).

The United States has also imposed non-tariff barriers on imported infant milk, such as Infant formula products must wait 90 days after receiving FDA approval to enter the market, receiving an initial inspection by the FDA, and thereafter annually It is a very cumbersome regulatory process, which is one reason that it is difficult to import infant formula.

FDA has strict control over labeling and nutrition standards. All formulas must contain 29 different ingredients. A minimum limit is set for each ingredient. Some ingredients also have maximum levels allowed(Natalie Kienzle 2022). The differences between European and U.S. formulas are minimal. Many mothers tend to choose European formula because it may have higher quality and more variety. Two of the most popular brands are HiPP and Holle. Both brands are widely used in Europe and the rest of the world. However it is illegal to import infant them for commercial purposes due to non-compliance with labeling requirements, but it can be used for personal.

3. How do we prevent this from happening again

We need to look at a program that will ensure that in the future the closure of one plant does

not affect the entire system. Encourage more infant formula producers to enter the competition(Scott Lincicome. 2022). Some of the reforms include:

- Congress should take steps to encourage more competition and innovation..
- Scaling down the model and size of the WIC program to allow consumers to purchase any infant formula available in the U.S. market
- Require the FDA to allow the import, sale of any infant formula approved by a competent foreign regulatory agency
- Amend the USMCA to allow for the free movement of infant formula between the United States, Canada and Mexico.
- Eliminate tariffs and tariff rate quotas on imported infant formula.

Conclusion

This nationwide shortage stems largely from cronobacter and salmonella infections of Abbott's formula that led to the closure of its plant in Michigan, which normally supplies most of the nation's infant formula. The monopoly of the market and the tariff policy have aggravated the crisis. The U.S. government needs to create a freer environment for more suppliers to join and reform government procurement policies to promote the market.

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