



TOY IMPORT AND RECALL LEVELS: IS THERE A CONNECTION?

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This paper analyzes US toy imports and toy recalls between 1992 and 2006. We found that toy recalls have increased at a faster rate than the increase in imports from foreign countries. Also, design-related recalls were higher, and increased faster, than manufacturing-related recalls. Interestingly, these trends were less pronounced for Chinese-made toys than those made in other countries. We discuss the implications of these three trends and suggest potential remedies.

Every year in the United States, over 200,000 children are injured while playing with toys, around 15 of which result in fatalities.¹ Many of these incidents could have been prevented by increased product safety vigilance. Mattel's recall in late summer 2007 of over 20 million toys made in China, served as a powerful example of the scale of the issue. Quality defects that compromise safety not only harm consumers, but can also have dramatic negative effects on the companies involved all along the affected supply chain. Moreover, the popular sentiment of some people against Chinese-made products potentially has serious implications for global trade.

Analysts have often dubbed China as the 'workshop of the world.' This is particularly true for the US\$71 billion global toy industry.² Approximately 60% of the toys sold across the world are made in China. Widespread expressions of concern in the media regarding the safety of Chinese-made toys have caused some worried consumers to regard the "Made in China" label as a warning. However, their efforts to buy toys made in the US proved in vain since the vast share of toy production has already moved to China. Consequently, everyone is wondering: *do imports from China mean poor quality goods and more recalls?*

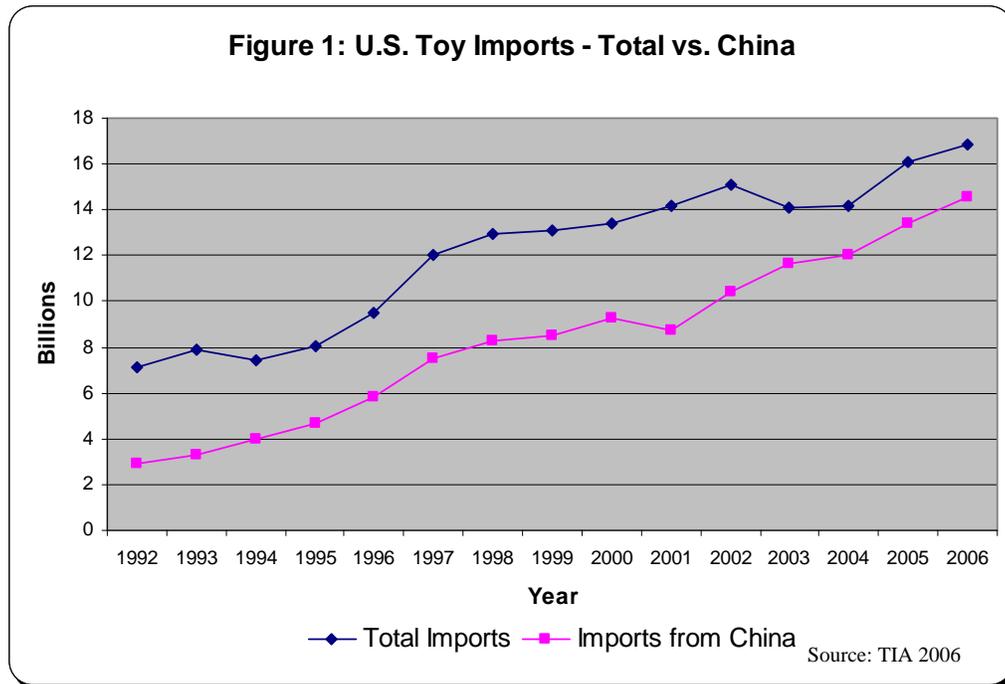
We seek to address this question by analyzing US toy imports and recalls for the period 1992 to 2006. We then analyze US toy recalls by comparing imports from China to those of other countries and by distinguishing between design- and manufacturing-related recalls. Finally, we discuss the implications of our findings for consumers and managers, and suggest potential remedies.

Toy Imports – The Rise of the Dragon

In 2006, an estimated US\$22.3 billion worth of toys were purchased in the United States.³ Over the years, US toy companies shifted their production overseas and focused their domestic operations on product design, marketing, research and development, and other high-value activities. As a result, US toy imports have increased, while employment in the domestic toy industry has declined from 42,300 workers in 1993 to 17,400 workers in 2005⁴. In 2004, US domestic production was only US\$3.54 billion. In 2005, the US exported about US\$1.07 billion worth of toys. These figures indicate that only a small portion of the demand for toys in the US market is met by domestic production, while the rest is met through imports.⁵

Chinese-made toys accounted for a full 86% of toy imports to the US in 2006, up dramatically from 41% in 1992. The rise of China came at the expense of other toy exporting countries, whose combined share of toy imports to the US plummeted from

59% to 14% during the same period. For instance, Japan remained a strong exporter of toys to the US until a substantial drop around 2001. Despite its proximity to the US, Mexico has not been able to sustain the up-tick it experienced in 2002. Further, Taiwan and Hong Kong toy exports have both been in decline for over a decade. We present the US toy imports and imports from China in Figure 1. The lines representing other countries' imports are not included simply because of their relatively low share in US imports (under US\$ 1 billion each).



China's rising share of US toy imports, and more generally China's position in the global toy industry, can be attributed to the lower cost business environment in China. China has attracted tremendous foreign direct investment and outsourcing of manufacturing operations. While analysts have often pointed to the phenomenal economic growth in China, they have also noted the resultant pressure on the physical, technical, and human resource infrastructures.⁶ Have these pressures resulted in some cracks? Has the growth in Chinese imports resulted in lower quality goods coming to the US?

Toy Imports and Manufacturing vs. Design Related Recalls

Recent empirical evidence has pointed to an upward trend in the recalls of Chinese-made toys, but concluded that Chinese manufacturing was not the main reason for the increase in recalls.⁷ By differentiating between design-related recalls and manufacturing-related recalls, Bapuji and Beamish (2007) demonstrated that the majority of US toy recalls were due to design problems, although manufacturing-related recalls, too, have increased in the recent past.

That study looked at the absolute number of recalls but did not take into account the growth of US toy imports. We fill this gap, by analyzing the trends in toy recalls normalized for US toy imports. In other words, we make the recall data from China and other countries proportional to their respective shares of US toy imports. Our aim is to

answer the question: *Are recalls of toys made in China out of proportion with those of other countries?*

Our quantitative analysis relies entirely on publicly available data. We collected US toy import statistics for SIC codes 3942, 3944 from 1992 to 2006, using tariff and trade data from the US Department of Commerce and the US International Trade Commission. The toy recall data was collected from recall notices posted on the Consumer Product Safety Commission's website. The recall notices typically include information on where the toy was manufactured, the quantity of toys recalled, the average sales price of the toys and relevant dates. About 30.1% of 349 recall notices did not include information on country of manufacture and were not included in this analysis; however, there appears to be no meaningful pattern behind these missing data. A further 2.9% of recall notices were excluded because they pertained to toys made in the US, leaving a final sample of 233 data points.

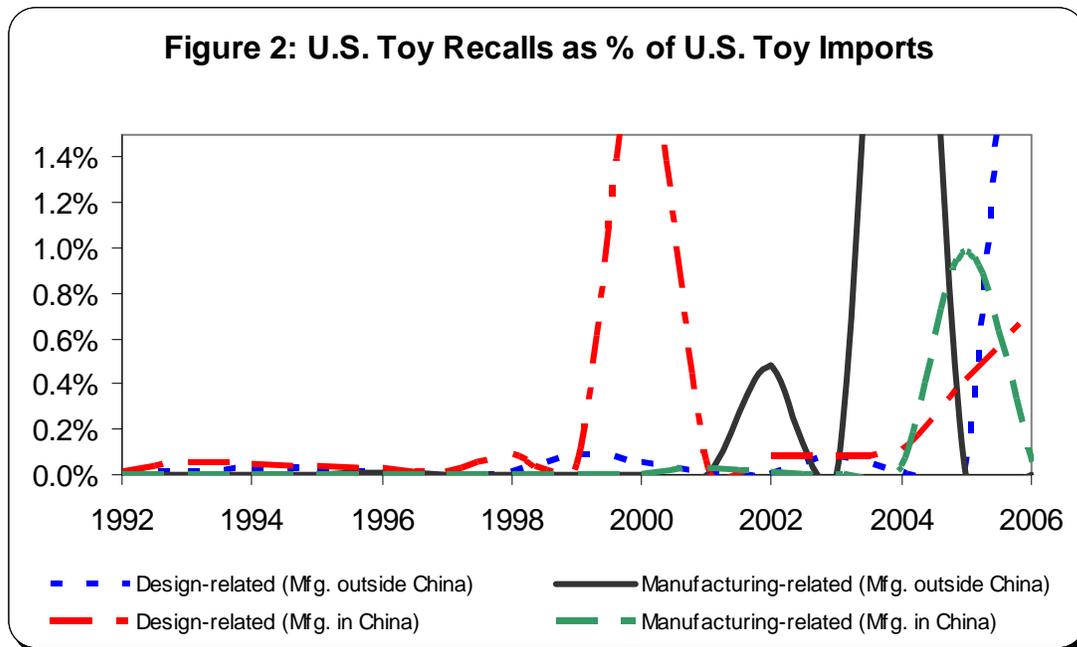
Our interest in this research is to examine if recalls of Chinese-made products are out of proportion with those of other countries. Since the import data is counted in dollars, we computed a dollar measure for recalls by multiplying the number of units involved in a recall with its average sale price. In their analysis, Bapuji and Beamish (2007)⁸ used the number of recalls announced by the Consumer Product Safety Commission in each year. The number of recalls may not, however, capture the complete impact of recalls because a recall of 200 toys will be counted in the same manner as a recall involving two million toys. Nonetheless, we did robustness checks using the previous methodology and found the results to be roughly similar.

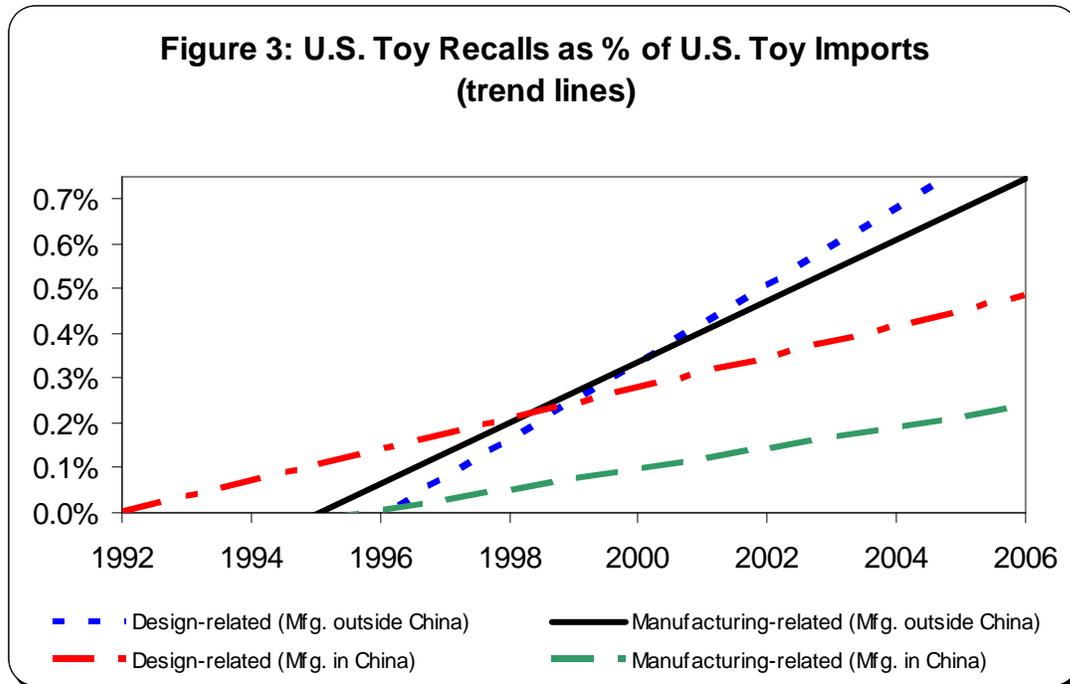
Our measure considers the number of toys in each recall and thus helps to better understand the severity of the problem. We aggregated the dollar value of recalls by year and then divided it by the dollar value of imports for each year. Consequently, our measure of recalls approximates the percentage of imports that are recalled in each year. Our measure does not capture the recalls as an exact percentage of imports because the sale price in the US includes a margin over the import cost and thus will be higher than the cost of imports.

In order to better understand which parts of the supply chain are most in need of improvement, we distinguished between design- and manufacturing-related defects. Design defects include such things as the use of small detachable parts, like button-eyes and beads as well as the use of strings and awkward spaces that can lead to strangulation or entrapment. Manufacturing defects include the use of toxic chemicals (such as the recent high lead content found in some toys), faulty assembly or substandard parts. The responsibility for design problems usually lies with toy companies in the West that provide the designs. By contrast, the responsibility for manufacturing problems lies mostly with overseas toy manufacturers.

We coded the recalls as either "manufacturing-related" or "design-related" based on the information provided in the recall notices. The coding was replicated independently by four people, two of whom were not directly associated with this research. The coding was reliable given the ambiguity of the recall notices, which are often carefully crafted not to place blame.⁹ Although the assessment of defect type is subjective, the consistency of the coding gives us sufficient confidence in the results to allow us to draw conclusions about general patterns.

We present our analysis in Figures 2 and 3. The chart in Figure 2 uses the actual data whereas the chart in Figure 3 uses the same data, but presents them as trend lines. The trend lines for both design and manufacturing-related recalls of Chinese-made toys as well as toys made elsewhere indicate that all of these categories have been increasing over the years. Trend lines are used to depict general patterns and tend to be sensitive to very large data values (outliers). To this effect, the design-related recalls of products manufactured outside China would have been nearly flat were it not for a very large recall involving Nintendo game controllers in 2006¹⁰. Similarly, manufacturing-related recalls of products manufactured outside China would have increased at a much lower rate had there not been a very large recall of toy jewellery in 2004¹¹. Both design and manufacturing related recalls of Chinese-made toys have seen large increases since 2004, a fact that is not entirely evident from looking at the trend lines alone. For example, the manufacturing-related recalls of Chinese-made toys were about 2% of all the toys recalled between 1992 and 2001. This figure increased to 10% during 2002-2006.





As presented in Figure 3, manufacturing-related recalls of Chinese-made toys were almost negligible until 1996, but increased to about 0.25% of US toy imports from China by 2006. By contrast, design-related recalls increased to about 0.5% of the toy imports from China by 2006. The trend lines indicate that for Chinese-made toys, manufacturing-related recalls are increasing at a somewhat slower rate than design-related recalls.

Both the manufacturing- and design-related recalls of non-Chinese made toys were almost negligible until just over a decade ago, but increased to over 0.4 and 0.7% of the toy imports from these countries by 2006. The trend lines for non-Chinese recalls also indicate that manufacturing-related recalls are increasing at a somewhat slower rate than design-related recalls.

Relative to the overall toy imports into the U.S, the percentage of toys recalled is small. However, in absolute terms the numbers of units recalled is quite large and pose hazards to children. For example, in the year 2006, a total of 7.4 million toys were recalled. In contrast, only 3.5 million toys were recalled in 2001. In other words, the number of toys recalled has more than doubled in five years.

Overall, there is an increasing trend in recalls, both for toys made in China and those made elsewhere. This trend should be worrisome to everyone concerned, including consumers, domestic toy companies, overseas manufacturers and governments.

Discussion

Our analysis revealed three specific points. First, that there has been a dramatic rise in China's share of US toy imports. Second, recalls of toys made in countries other than China have increased more than those from China. Third, there has been an increase in recalls of toys for design and manufacturing flaws, irrespective of where they were made. We discuss each of these points in detail.

Role of China in the Global Toy Industry. The growth of the Chinese economy and the rise of China as an active participant in the global trade environment have regularly been noted. Our analysis of toy imports into the US underscores the rise of China, and the decline of other countries, as a major player in global toy production. Many countries purchase a lot of toys, but produce very few of them. These markets increasingly depend on Chinese production to serve their toy consumption needs. Therefore, any problem involving toys is more likely to involve China than any other nation. Consequently, any solution to the problem also needs to involve China more than other nations.

China vs. Non-China. Although manufacturing-related problems result in fewer recalls than design-related problems, it is worrying to note that they are on the rise. Our analysis suggests that manufacturing problems are, in general, becoming more prominent over time. For instance, in 2007, about 1.5 million toy vehicles were recalled due to lead paint used by a Chinese manufacturer.¹² Although the number of toys recalled due to manufacturing problems is only 0.5% of total Chinese imports, in absolute terms, they amount to toys worth US\$72 million.

Considering that imports from countries other than China are decreasing, the increasing trend for manufacturing problems from these other countries is surprising and raises concerns. On the other hand, the steady increase in manufacturing-related problems for Chinese-made toys is worrisome because of the sheer volume of toys that are made in China. A similar study on Canadian recalls also noted concerns about increased problems with Chinese toys.¹³

While toys made outside China accounted for a mere 14% of US toy imports, manufacturing problems with these toys are relatively more serious for these countries than for China. For instance, in 2004, four firms recalled about 150 million pieces of toy jewellery made in India¹⁴, because they contained excessive amounts of lead. In 2002, approximately 75,000 South Korean-made pedal-cars, retailing between \$100 and \$300 were recalled due to excessive lead.¹⁵ These recalls are very substantial given that these countries export three or four orders of magnitude fewer toys to the US than does China.

Increase in Recalls. Our analysis reveals that recalls increased across the board -- both for manufacturing and design reasons and both for the toys made in China and elsewhere. Further, the design problems account for a larger share of the recalls than the manufacturing problems. This finding echoes the past findings of researchers working with UK and US data.¹⁶

The increase in recalls is an issue that large toy companies need to heed. The recalls have serious implications not only for consumers and governments, but also to the bottom lines of toy companies. Governments can encourage toy companies to learn from recalls by making successive recalls costlier to companies. In particular, when a company repeats the same mistake, tougher measures may be required to deal with it. Thus, government can promote learning from recalls as well as encouraging and mandating recalls of unsafe toys.

The increase in manufacturing recalls is an issue that needs attention from both overseas manufacturers and US domestic toy companies. Overseas manufacturers

need to educate themselves about the safety standards and consumer expectations of the Western markets. More importantly, domestic toy companies need to ensure product quality by working more closely with their overseas suppliers. For instance, they should engage in joint problem-solving, improve communication, and cross-train engineers between design and manufacturing processes. These strategies help to ensure that the organizations gain knowledge of the entire chain of production, resulting in quality improvements.¹⁷ In order to decrease toy recalls, all the participants involved in the supply chains, particularly the large companies in the toy industry, should consider increasing their attention to these approaches and working closely with other participants.

Conclusion

Our analysis points to a steady increase in recalls over and above the increase in imports. We found that design problems are not only responsible for the majority of toy recalls but are also increasing faster, regardless of where the manufacturing occurs. At the same time, the fact that manufacturing problems are also increasing raises concern about the slippages occurring in the supply chains. In order to decrease toy recalls, all participants in the toy supply chain, particularly the large companies in the industry, should analyze the recalls and improve their practices.

¹ Source: Consumer Product Safety Commission.

² International Council of Toy Industries http://www.toy-icti.org/toy_markets_in_the_world_071002%20.pdf .

³ Ibid.

⁴ Toy industry outlook 2006 http://www.ita.doc.gov/td/ocg/outlook06_toys.pdf .

⁵ Ibid.

⁶ Beamish P. 2006. The High Cost of Cheap Chinese Labor. Harvard Business Review. June 2006: 23.

⁷ Bapuji H, Beamish P. 2007. Toy recalls: Is China really the problem?: Canada-Asia Commentary, 45, Asia Pacific Foundation of Canada: Vancouver, Canada, <http://www.asiapacific.ca/analysis/pubs/pdfs/commentary/cac45.pdf> .

⁸ Ibid.

⁹ Felcher M. 2001. *It's No Accident: How Corporations Sell Dangerous Baby Products*. Common Courage Press. Monroe, US.

¹⁰ <http://www.cpsc.gov/cpsc/pub/prerel/prhtml07/07061.html> .

¹¹ <http://www.cpsc.gov/cpsc/pub/prerel/prhtml04/04174org.html> .

¹² <http://www.cpsc.gov/cpsc/pub/prerel/prhtml07/07212.html> .

¹³ Andrus D. 2007. A Question of Quality and Trust: Product Recalls in Canada. National Quality Institute.

¹⁴ <http://www.cpsc.gov/cpsc/pub/prerel/prhtml04/04174.html> .

¹⁵ <http://www.cpsc.gov/cpsc/pub/prerel/prhtml02/02104.html> .

¹⁶ (i) Sambrook Research International. 2000. Product Recall Research. Consumer Affairs Directorate, Department of Trade and Industry: London, UK. (ii) Bapuji H, Beamish P. 2007. op cit.

¹⁷ Takeishi, A. 2001. Bridging inter and intra-firm boundaries: Management of supplier involvement in automobile product development, *Strategic Management Journal*, 22:403-433.