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TOY RECALLS AND CHINA: ONE YEAR LATER

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A record number of consumer product recalls in 2007 led many observers to dub it "The Year of Recall." While a number of Chinese-made products, such as pet food, toothpaste and tires were recalled, the large number of toy recalls led to widespread outrage by consumers and other stakeholders. The safety of imported products quickly became an issue of concern in Western countries and resulted in a number of regulatory and legislative actions. For example, the Consumer Product Safety Improvement Act of 2008 was introduced in the US to enhance the safety of imported products. Similar legislation is also expected to be introduced in Canada. The European Union conducted a number of wide-ranging stocktaking exercises to evaluate consumer product safety.

Ensuring toy safety is difficult because the toy supply chain is truly global: design and development are concentrated in the West, particularly in the US, while manufacturing is heavily concentrated in Asia, particularly in China. Several intermediaries in Hong Kong, Singapore and Europe specialize in coordination and quality control, while distributors and retailers in several countries take the toys to world markets. A slippage at any point in the global supply chain can affect consumers around the world.

Recognizing the complexity of the issue, the European Commission set up an independent team of experts from around the world to evaluate the measures taken by organizations at every point in the toy supply chain. The team recommended a number of initiatives to ensure toy safety, but focused largely on China because of its central role in the toy supply chain. Interestingly, the team concluded: "the Chinese government operates a system of toys export controls, which in its scope and depth is by far the most elaborate in the world"[1]. However, recalls appear to continue unabated with several new issues surfacing, such as melamine in milk and milk-based products from China.

In view of the above, we examined US toy recalls from 1988 to 2008 (September) to identify pertinent trends. We paid special attention to toy recalls involving lead because they caused serious concern in 2007 and continue to be prevalent in 2008. The presence of excessive lead in toys remains uppermost in the minds of Canadian consumers and other stakeholders following recent investigations by the *Toronto Star* and the consequent recall of toys by Health Canada[2]. This paper also builds on and extends our earlier research on this topic[3].

Toy Recalls Since 1988

We compiled a database of toy recalls based on the recall notices posted on the website of the US Consumer Product Safety Commission (CPSC). Please see Appendix 1 for details about data sources and other methodological issues. We present the data on toy recalls in Table 1, with special attention given to those involving products made in China and those recalled for excessive lead. We also present the data pictorially in Figure 1 to allow a visual interpretation of trends and developments[4].

Table 1: Number of Toy Recall Announcements (1988-2008)

Year	Total Recalls	China Recalls		Lead Recalls	
		Number	Percentage	Number	Percentage
1988	32	2	6%	0	0%
1989	54	5	9%	2	4%
1990	34	6	18%	0	0%
1991	36	14	39%	0	0%
1992	25	10	40%	1	4%
1993	19	5	26%	1	5%
1994	31	19	61%	5	16%
1995	25	11	44%	0	0%
1996	22	9	41%	4	18%
1997	26	9	35%	0	0%
1998	30	12	40%	2	7%
1999	23	4	17%	1	4%
2000	37	20	54%	1	3%
2001	43	21	49%	4	9%
2002	34	16	47%	2	6%
2003	35	20	57%	2	6%
2004	30	22	73%	4	13%
2005	35	29	83%	5	14%
2006	41	33	80%	5	12%
2007	83	79	95%	43	52%
2008*	54	43	80%	20	37%
Total	749	389	-	102	-

* Data up to September 30, 2008

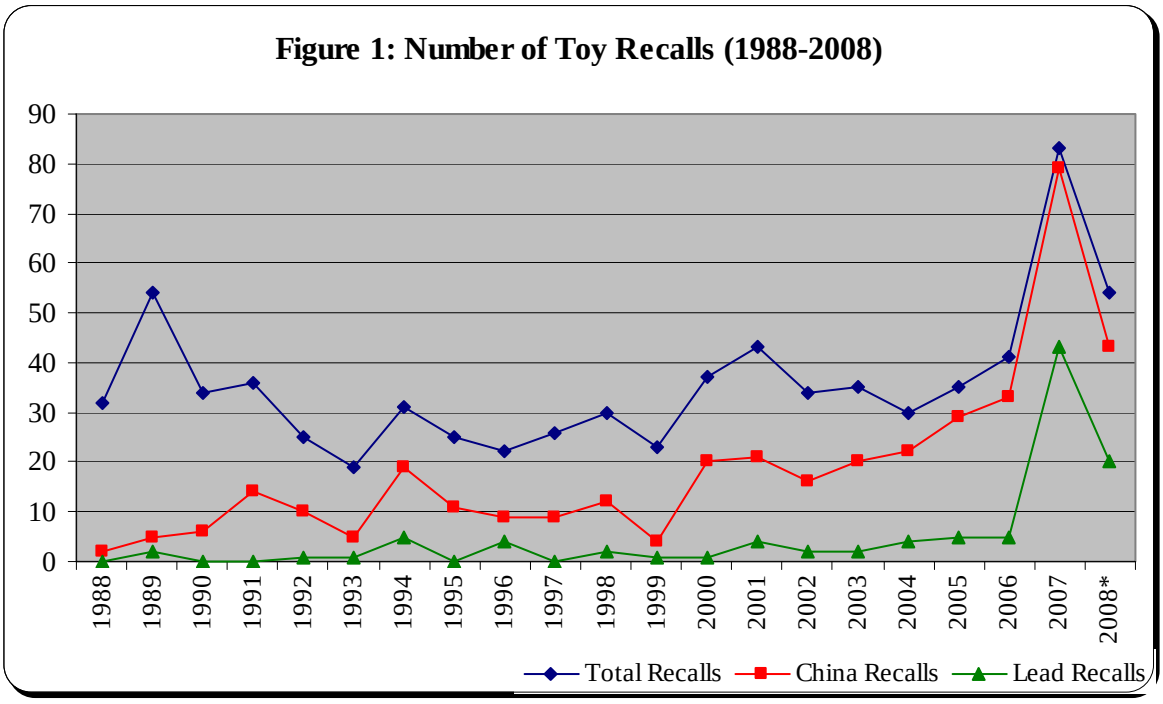
In line with the observations made by many analysts, the number of toy recalls in 2007 reached a record high of 83. The increase in toy recalls has continued in 2008. Since the beginning of this year, a total of 54 toy recalls were announced. During the same period (January to September) in 2007, a total of 49 toy recalls were issued. Despite the apparent increase in toy recalls this year, the recalls in 2008 may not surpass the 2007 figures because the last quarter of 2007 witnessed an unusually high number of recalls. It seems unlikely that it will recur this year. For example, during October 2007, a total of 15 toy recalls were announced whereas October 2008 witnessed only five toy recalls.

At the end of 2007, about 95% of the recalls were for toys made in China. In 2008, only 80% (43 out of 54 recalls) involved toys made in China. However, this decrease was not due to decreasing toy imports from China. China's share of US toy imports reached a record high of 89.33% in 2007, growing over 3% from its share (85.9%) in 2006. During the same period, US toy imports increased by a staggering 28.56% (from US$16.97 billion in 2006 to US$21.77 billion in 2007) whereas toy imports from China increased by 33.56% (from US$14.59 billion in 2006 to US$19.45 billion in 2007). China's share of US toy imports continues to rise, as evidenced by the 2.2% growth in toy imports from China in the first two quarters of 2008 compared with the same period in 2007[5]. In other words, notwithstanding the toy recalls in the last two years, more and more toys are being imported into the US from China each year. Therefore, the drop in recalls of

Chinese-made toys in 2008 cannot be attributed to a drop in imports. We return to this issue later when we analyze recalls as a percentage of imports.

The share of US toy imports from the rest of the world (all countries other than China) is very low (about 10%). Considering this, it is surprising to note that 11 toy recalls (20%) announced in 2008 involved toys made outside China. The toys involved in these recalls were made in Hong Kong (4 recalls), India (2), Taiwan (2), Thailand (2) and Germany (1). Interestingly, nine of these recalls involved toys introduced into the market in 2007. Following the recalls in 2007 summer, the demand for toys made outside China has increased. Also, toy companies began to explore toy making in countries other than China, following the increase in costs of toy making in China in recent years[6]. If these recalls of toys made outside China are any indication, shifting manufacturing outside China might not necessarily help to reduce recalls.

Figure 1: Number of Toy Recalls (1988-2008)

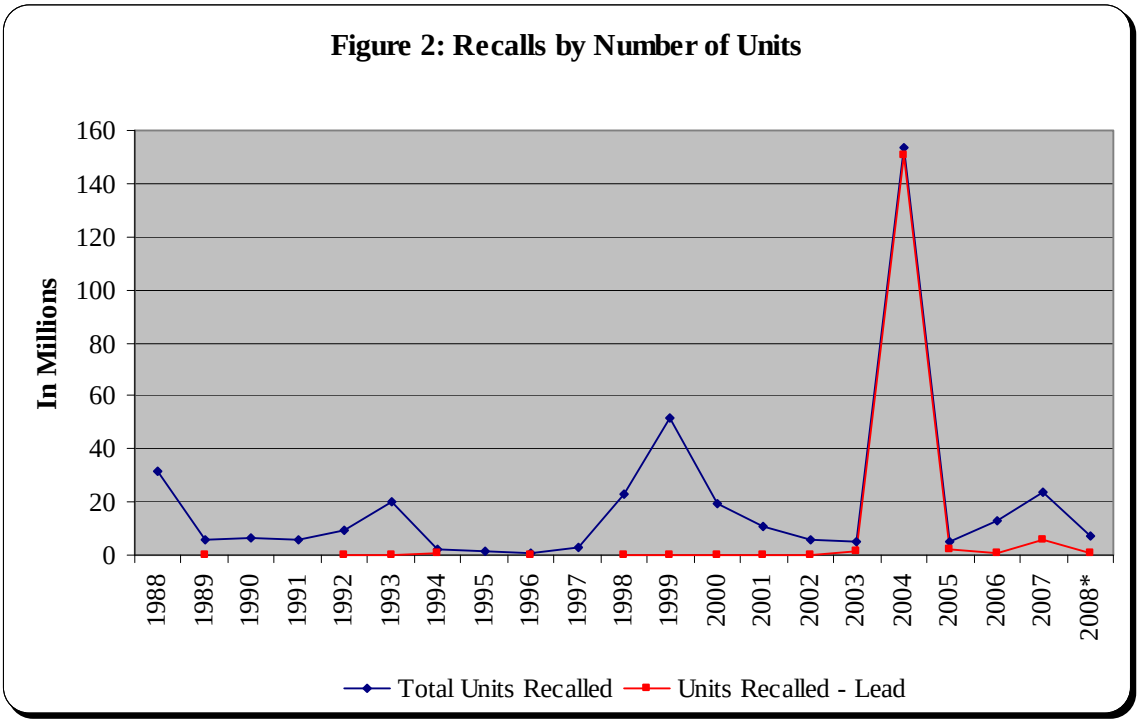


As presented in Figure 1, the number of toy recalls involving excessive levels of lead remained negligible until 2006, but increased sharply in 2007 to a record high of 43 (or 52% of all toy recalls). In 2008, a total of 20 recalls (or 37% of all toy recalls) were issued for lead hazards. The continued recalls of toys for lead are a cause for concern. However, examining the growth in recalls by simply counting the number of recalls might not reveal the full picture because the toy recalls vary greatly in size, ranging from as few as 40 units[7] to as many as 150 million units[8].

Toy Recalls: Size Matters

Considering the wide variation in the size of a recall, it is important to examine the number of units included in each recall to get a clearer picture of trends. Accordingly, we present in Figure 2 the total number of toys (in units) recalled each year. Further, we also present the number of units recalled for excessive lead. Please note that the outlier in 2004 is because of an unusually large recall of 150 million pieces of toy jewellery sold for an average of 50 cents between 2002 and 2004. The investigations by CPSC revealed that some of the jewellery contained lead and it was estimated that about half of the total jewellery sold was affected. However, the firms in question recalled all the products because it was difficult to identify which units were affected. In Table 2, we present the data used for creating Figure 2 and also include the number of recalled units that were made in China.

Figure 2 reveals an interesting trend in recalls. In contrast to Figure 1, which shows recalls increasing continuously, the number of units recalled seems to be relatively flat, with occasional punctuations. The number of units recalled annually has remained below 20 million in all but five of 20 years. All five cases involved large and unique recalls as discussed below.



As previously noted, over 150 million pieces of toy jewellery made in India were recalled for excessive lead in 2004. The second largest number of units (over 51 million toys) was recalled in 1999. Of these, 25 million were promotional Pokemon balls distributed by Burger King and another 19 million swimming pool dive sticks recalled by 15 firms. In 1988, Kellogg recalled 30 million promotional toys. In 2007, Mattel recalled over 8 million toys because of detachable magnets while Spin Master recalled an additional 4.2

million Aqua Dots toys for chemical hazards. Further, RC2 and Dunkin' Donuts recalled an additional one million toys each.

As presented in Table 2, about 404 million toys have been recalled since 1988 on 749 occasions. However, only 40 large recalls (about 5%) accounted for 344 millions units recalled (about 77%). The number of toys recalled in 2008 (up to September 30, 2008) was 6.85 million. Of the 6.85 million toys recalled, nearly half (3.4 million) were recalled by two companies on three occasions – Mega Brands issued two recalls for 2.4 million units of magnetic toy figures and Kids Station issued a recall for one million toy cell phones. In sum, despite the increase in recall announcements, the total number of units recalled over the years does not appear to have increased, except for the occasional and unusually large recalls.

Table 2: Number of Toys Recalled (1988-2008) – In Units

Year	Total Units Recalled	Units Recalled - China		Units Recalled - Lead	
		Number	Percentage	Number	Percentage
1988	31,690,440	10,000	0%	0	0%
1989	5,980,354	132,000	2%	40,000	1%
1990	6,404,987	215,861	3%	0	0%
1991	5,528,942	1,141,779	21%	0	0%
1992	9,264,999	134,404	1%	16,300	0%
1993	19,855,010	436,044	2%	10,000	0%
1994	2,285,926	1,367,307	60%	1,015,407	44%
1995	1,645,798	821,141	50%	0	0%
1996	947,489	204,564	22%	112,100	12%
1997	3,161,582	212,482	7%	0	0%
1998	22,785,027	1,325,600	6%	18,500	0%
1999	51,706,420	554,800	1%	21,000	0%
2000	19,417,700	16,559,600	85%	1,200	0%
2001	10,590,795	9,574,400	90%	80,200	1%
2002	5,951,660	5,280,100	89%	175,000	3%
2003	4,959,770	2,960,150	60%	1,403,800	28%
2004	153,414,928	1,996,075	1%	151,002,430	98%
2005	4,809,335	4,748,960	99%	2,165,240	45%
2006	12,844,797	10,155,850	79%	734,300	6%
2007	23,710,360	23,538,560	99%	5,966,660	25%
2008*	6,846,910	6,006,600	88%	363,930	5%
Total	403,803,229	87,376,277	-	163,126,067	-

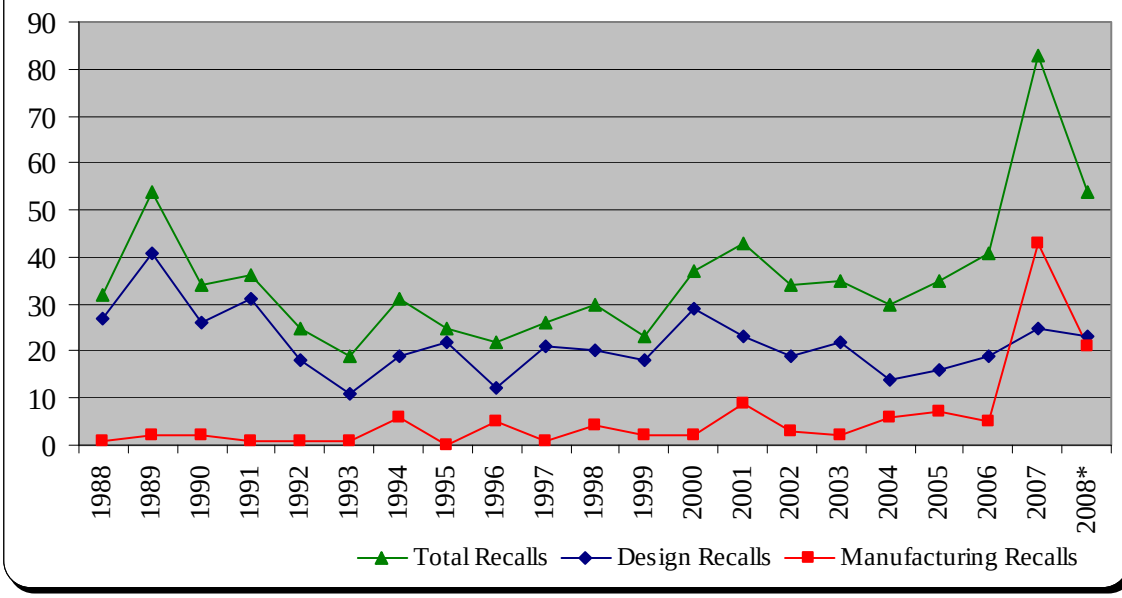
Since 1988, about 26% of the toy recall announcements were for lead hazards, but they accounted for 40% of all the toys recalled. In contrast, the number of lead recalls was 37% of the total toy recalls in 2008 but they accounted only for 5% of the total toys recalled in 2008 (see Table 1). Similarly, although 52% of the toy recalls issued in 2007 were for lead poisoning hazards, the number of units involved was only 25%. In other words, unlike in the past when fewer recalls were issued for large number of lead toys, more recalls were issued for fewer toys in the recent past, particularly in 2008.

Table 2 also reveals that about 52% of the toy recall announcements since 1988 involved toys made in China, but they accounted for only 22% of all the toys recalled (in units). In 2008, about 88% of toys recalled in 2008 were made in China compared with 80% of the recall announcements. Similarly, although 95% of the recalls involved Chinese-made toys in 2007, they accounted for 99% of all the units recalled in that year. In other words, historically Chinese-made toys accounted for a lower proportion of the toys recalled (in units) but were a larger proportion of the toy recalls (in announcements). However, in the recent past they account for a slightly larger percentage of units compared to their proportion in recall announcements. This begs the question of whether recalls of Chinese-made toys are increasing more than the growth in toy imports from China.

Toy Recalls, China and Imports

In examining the role of China in toy recalls, it is important to consider China's share of imports because nearly 90% of US toy imports are from China. It is equally important to distinguish between manufacturing and design flaws that result in recalls because while manufacturing of toys occurs in China, their design mostly takes place outside China[9]. A recall may occur due to a design problem such as long strings, sharp edges, or small detachable parts. Alternatively, a recall may occur due to a manufacturing problem such as use and presence of dangerous materials (such as lead paint on toys and needles in the stuffing of plush toys). Accordingly, we distinguish between design and manufacturing recalls and present them by number of recalls (Figure 3) and number of units (Figure 4).

Figure 3: Toy Recalls by Flaw Type (1988-2008)

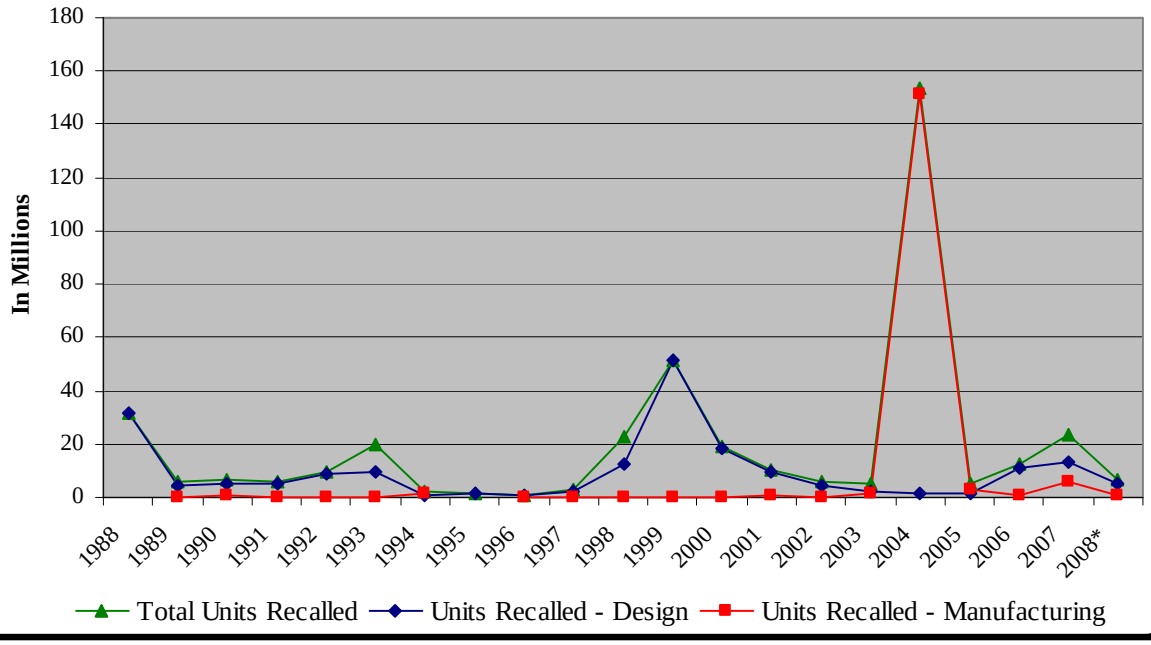


As presented in Figure 3, the number of toy recalls due to design flaws has always been higher than those due to manufacturing flaws, with the sole exception of 2007 when lead related recalls outnumbered the recalls due to design flaws. Since 1988, a total of

749 toy recalls were issued. Of these, nearly 61% were due to design flaws whereas about 17% were due to manufacturing flaws. The remaining recalls could not be categorized into design or manufacturing flaws[10]. Of the 124 recalls due to manufacturing flaws, over 82% (102) were due to presence of excess lead in toys.

As presented in Figure 4, the number of toy units recalled for design flaws has also been higher than those recalled for manufacturing, with the exception of 2004. As noted earlier, over 150 million pieces of toy jewellery were recalled in that year causing the number of units recalled for manufacturing to go up in an unusual manner. As a result, the percentage of units recalled for manufacturing defects since 1988 reached nearly 41%s of all the recalls while the recalls for design flaws were 49.4%. However, if the large jewellery recall in 2004 is excluded from the calculations, the number of units recalled for manufacturing flaws decreases to six% while those recalled for design flaws increases to over 78%. Therefore, it is reasonable to conclude that design flaws have historically resulted in more recalls than manufacturing flaws.

Figure 4: Number of Units by Flaw Type

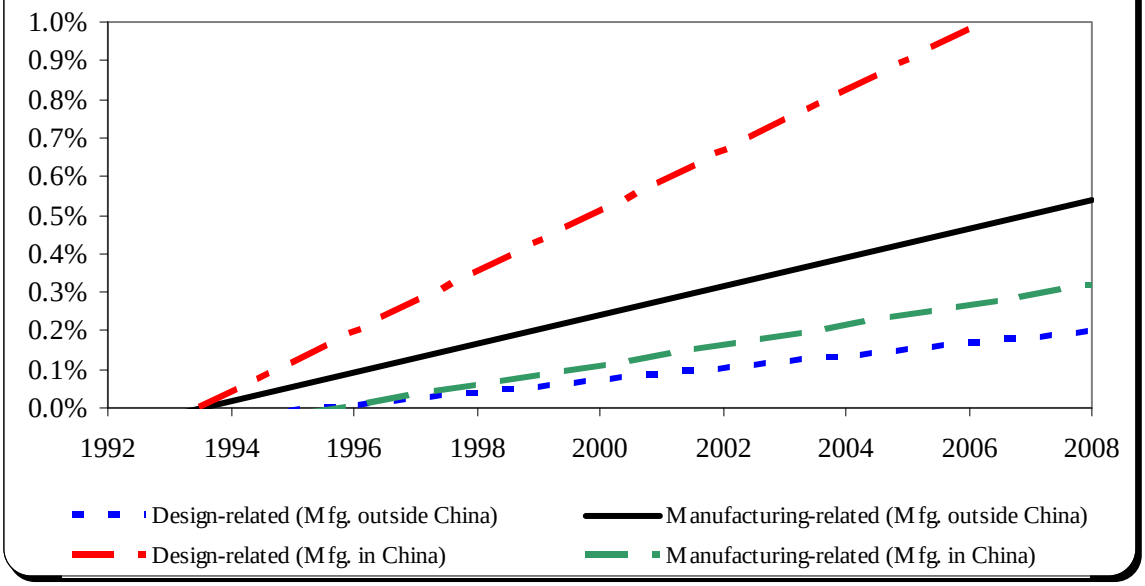


The distinction between design and manufacturing flaws, while important, does not reveal if recalls of toys made in China and other countries have grown in disproportion to the imports from those countries. To address this, we present trend lines of recalls as a percentage of imports.

As discussed in the methodology section, we take into account the price of toys recalled and arrive at an annual aggregate of toy recalls, which is converted into a percentage of imports[11]. Due to lack of data availability on toy imports in the third quarter of 2008, our analysis in this section only includes data up to June 30, 2008.

As presented in Figure 5, recalls of Chinese and non-Chinese toys for both design and manufacturing flaws have been increasing as a percentage of imports from those countries. However, the increase seems to be steeper for Chinese-made toys recalled for design flaws. Similarly, recalls of Chinese-made toys for manufacturing flaws seems to be increasing although as a percentage they appear to be lower than the percentage of non-Chinese toys recalled for manufacturing flaws.

Figure 5: U.S. Toy Recalls as Percentage of Imports (Trend Lines)



Note: Data up to June 30, 2008

Discussion

In this paper, we examined toy recalls by taking into account the number of recalls, units recalled and toy imports. Based on the analysis presented, we can arrive at three broad conclusions. First, while the number of toy recalls has increased, the number of toy units recalled has not witnessed a similar rise. In fact, if the trends continue, the number of toy units recalled this year will likely be lower than those recalled in 2007 and 2006. In other words, unlike 2007, this year may prove to be a typical year for recalls. Also, despite the increase in recalls for lead hazards, they appear to account for a smaller number of units. Notwithstanding these somewhat welcome developments, the increase in recalls relative to imports is an issue of concern that needs attention.

Second, design flaws (as opposed to manufacturing flaws) have been behind the vast majority of recalls. Consequently, great opportunities exist for companies to decrease recalls by improving designs. Although toy manufacturing is concentrated in China and other developing countries, development and marketing often occurs in the United States and other Western countries[12]. By paying closer attention to the design function, these companies could save precious resources and reduce harm to consumers[13].

Third, the increase in toy recalls from China and other countries must be viewed within the context of increased toy imports. Nearly 90% of toys sold in the US are imported from China and other Asian countries. Therefore, it should be expected that the product recall levels will reflect this reality. By clearly distinguishing between the roles performed by various companies in different countries, a better understanding of the reasons for recalls can be reached. Such an understanding could help to reduce recalls and improve the functioning of the global supply chains.

In conclusion, product recalls involving global supply chains is a complex phenomenon and calls for a nuanced understanding of the issues involved. However, very little research exists on product recalls[14]. Therefore, research is warranted on the reasons behind recalls and how the consequences of recalls can be reduced. By providing such insights, research can enable action by all the stakeholders so that products made in global supply chains are safe for consumers all over the world.

Methodology

We compiled a list of toy recall notices published on the CPSC's official website. We conducted the following three steps to ensure that the list was complete and accurate. First, we retrieved recall notices using the CPSC's search facility by product category with toys as the category (www.cpsc.gov/cpscpub/prerel/category/toy.html). Second, we searched for recall notices by 30 different toy product types (e.g., Toy Doll & Accessories, Toy Guns, Toy Trucks) using the CPSC's search engine (www.cpsc.gov/cgi-bin/prod.aspx). While these two lists overlapped nearly 90%, a number of recalls were unique to them. As the search facilities on the CPSC website now allow for searching for recalls in a number of ways, it could not be ascertained if the list generated by the first two steps was complete. Therefore, in the third step we collected all recall notices that conformed to the CPSC's standard recall URL specifications and cross-checked them with the previous lists, uncovering additional toy recall notices. At the end of these steps, we are confident that we retrieved nearly all toy recalls announced by the CPSC since its inception.

Our final list comprised 829 toy recall notices between 1974 and Sept 30, 2008. We collected the relevant data contained within the recall notices into a database, including the release number, recall date, number of units involved, average sales price per unit, hazard type (e.g., lead, small parts, sharp edges), and country of manufacture. Where multiple products were involved in a single recall, we pro-rated the sales price based on the number of units at each price. Also, in four cases, price was estimated to reflect the approximate value of specific components involved in the recalls. The results are same when the analysis is conducted with estimated price or full price.

We also coded the defect type, that is, whether the defect was likely due to a manufacturing or design flaw, leaving more ambiguous cases as 'not sure'. Defect type was assessed using all of the descriptive information available in the notices, such as lots involved, problem descriptions, remedies, photographs and sketches, as well as additional information from company websites and news reports. This field was also coded independently by a graduate engineering student, producing a high inter-rater reliability (Cohen's kappa = 0.86 $p < 0.0001$).

Some notices had missing data, including country of manufacture (32% missing), number of units (3.5% missing), and average price (9.7% missing). Earlier notices systematically had more missing values for price and units than later notices, but we believe that the number of missing cases is small enough not to confound the analysis. Missing values for country of manufacture did not follow a systematic pattern, although they tended to be more frequent in the late 1970s and early 1980s. Notices with missing values were excluded from the analyses. Some recall notices included multiple products (83 cases), multiple firms (15) or both (2). Nevertheless, each recall notice was counted as a single recall for the purposes of analysis presented in this report.

We collected the data on US toy imports from the website of the US International Trade Administration (http://www.ita.gov).

Endnotes

[1] Evaluating Business Safety Measures in the Toy Supply Chains: Final Report. European Commission. May 2008.
[2] http://www.cbc.ca/consumer/story/2008/10/24/recalls-clement.html
[3] Please see our previous research on this topic (a) Bapuji H, Beamish P. 2007. Toy recalls: Is China really the problem? Asia Pacific Foundation of Canada: Vancouver, Canada; (b) Bapuji H, Beamish P, Laplume A. 2007. Toy import and recall levels: Is there a connection? Asia Pacific Foundation of Canada: Vancouver, Canada; (c) Bapuji H, Beamish P. 2008. Product recalls: Avoid hazardous design flaws. *Harvard Business Review*(March): 23-26; (d) Beamish P, Bapuji H. 2008. Toy recalls and China: Emotion vs. evidence. *Management and Organization Review* 4(2):197-209.
[4] Some of the recall figures presented in this paper differ from the figures we presented in earlier papers because our initial data collection inadvertently missed some recalls. Further, we extended our search for recalls in the CPSC database in a number of ways as presented in the methodology section. We would like to thank Dr. Mark Fox for alerting us to some of these issues.
[5] http://www.ita.doc.gov/td/ocg/imp33993.htm
[6] Please see (a) Bapuji & Beamish, 2008. Mattel and Toy Recalls (B). Ivey Publishing. (b) Menon S. 2008. New twist in India's old toy story. BBC News. 17 Jan. http://mayaorganic.com/mopress/bbc-17jan08.html
[7] www.cpsc.gov/cpscpub/prerel/prhtml08/08597.html
[8] www.cpsc.gov/cpscpub/prerel/prhtml04/04174.html
[9] Some toys made in China are designed by Chinese companies and some toys designed by Western companies are manufactured directly by those companies in China. In other words, the toy value chain is not neatly separated between the West (design) and China (manufacturing). However, we make the assumption that design occurs in the West and manufacturing occurs in China for two reasons: first, it represents a vast majority of the real world phenomenon. Second, this assumption facilitates a simpler analysis to inform the debate on product recalls and the role of China. Please see our previous research on this topic Bapuji H, Beamish P. 2007; Bapuji H, Beamish P, Laplume A. 2007; Bapuji H, Beamish P. 2008; Beamish P, Bapuji H. 2008. op. cit.
[10] Although we could not categorize nearly one fifth of the recalls largely due to lack of adequate information in the recall notices, we believe that the recalls we covered represent the total recalls and there is no specific pattern to the recalls that could not be categorized. With additional information, nearly all recalls could be categorized. A study that focused on a smaller number of recalls and conducted an in-depth analysis arrived at similar conclusions with respect to the%age of design and manufacturing flaws in recalls. Please see Sambrook Research International. 2000. Product Recall Research. Consumer Affairs Directorate, Department of Trade and Industry: London, UK.
[11] Please see Bapuji et. al, 2007 op cit for details on the methodology.
[12] Toy industry outlook 2006 http://www.ita.doc.gov/td/ocg/outlook08_toys.pdf
[13] For example, the toys recalled for design flaws accounted for about US$ 370 million or nearly 1.7% of the toys imported into the US Please see Bapuji & Beamish. 2008. op cit.
[14] Beamish & Bapuji. 2008. op cit.