

Analysis of Daily Sales Data during the Financial Panic of 2008

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Quarterly and monthly data on U.S. personal consumption expenditures show a severe decline in consumer spending around the time of the financial panic in the fall of 2008. This decline substantially worsened the recession that had begun in December 2007. It is important, therefore, to determine the nature and causes of the accelerated decline.

Data collected and reported on a *quarterly* or *monthly* basis are not ideal for this purpose because one would like to examine whether financial events and news occurring on specific days—such the bankruptcy of Lehman—directly affected consumption. We can learn more about the timing of events using higher-frequency *weekly* or *daily* data. For example, was there a sudden drop in consumption on the day the news on the Lehman bankruptcy came out, or was it a week or more later as the policy proposals were put forward and debated in Washington. Or were the changes more gradual as more and more people learned of the news coming out of Wall Street and Washington and pulled back, fearing the worse? More precise timing can also help determine whether the decline in consumption was due to a sudden restriction of credit availability or to a drop in demand as people's concerns about the future grew.

This short note examines these questions using daily data provided courtesy of the Target Corporation. The data are daily aggregate sales volumes at Target stores throughout the United States during the period of the financial panic.

Daily Sales in 2008 Compared with 2007

Figure 1 shows an index of aggregate daily sales at Target stores from mid August 2008 through mid November in 2008. It also compares these data with sales in the same period in 2007. Comparing 2008 with 2007 is a way to take control for seasonal variation. Sales in 2008 are shown in blue and sales in 2007 are shown in red.

Observe that there are large within-week sales swings, with weekend sales far greater than weekday sales. For this reason the 2007 data are advanced forward by two days in the chart so that the days of the week are aligned in the two series. In other words, sales for Saturday, September 13, 2008 are aligned with sales on Saturday, September 15, 2007. The chart ends just before Thanksgiving because of the difficulties of comparing the Thanksgiving-Christmas period in 2007 versus 2008.

As shown in Figure 1, sales from mid August to mid September 2008 are slightly lower than in the same period of 2007. This is not surprising in that the United States entered a recession starting in December 2007. In addition, however, a close examination of Figure 1 reveals a sharp accelerated reduction in sales (compared with 2007) starting around mid to late September 2008 and lasting into November. This reduction is on top of the already reduced sales due to the recession.

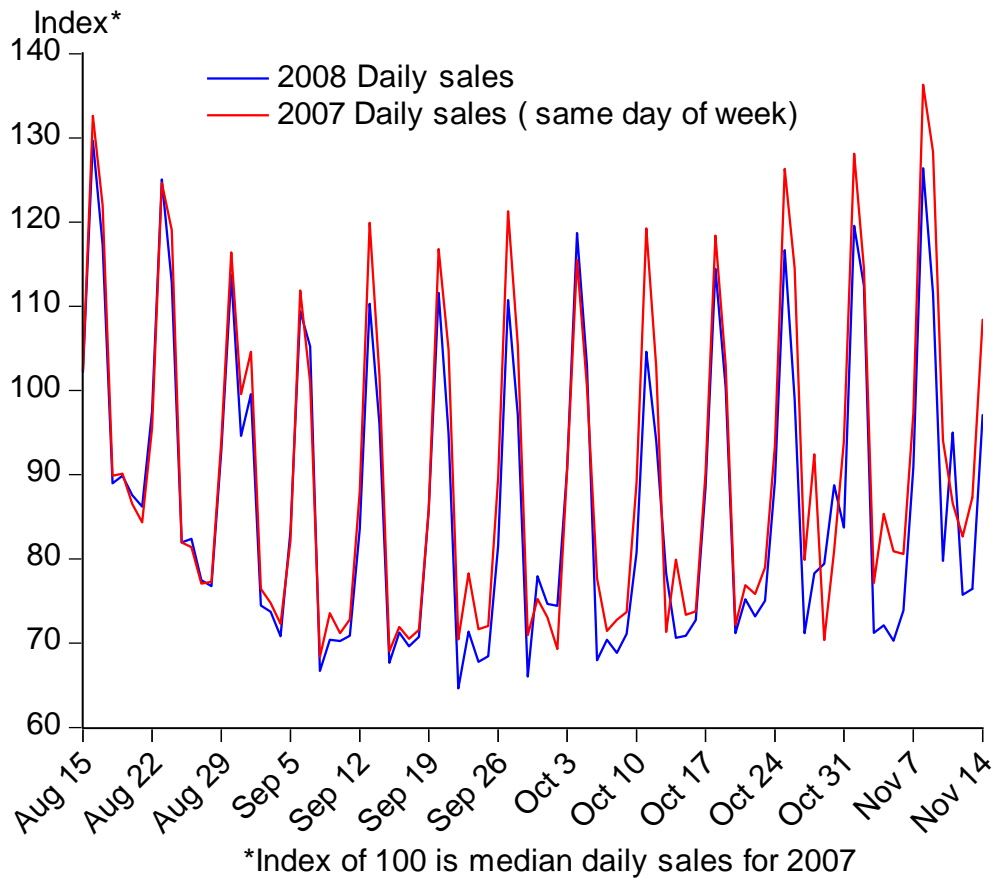


Figure 1. Daily Sales in August-November: A Comparison of 2007 and 2008

The Cumulative Sales Gap and the Timing of the Accelerated Decline in Sales

Unfortunately the large within-week swings make it difficult to determine the exact timing of this accelerated reduction. However, by *accumulating* daily sales (starting in August) one can better see through the up-and-down within-week variations. Figure 2 shows how this works. It shows the cumulative sales figures for both years. Observe how 2008 cumulative sales (blue line) fall below 2007 cumulative sales (red line) in September. The gap between the two thus begins to widen at some time in September and continues to widen for the next few months.

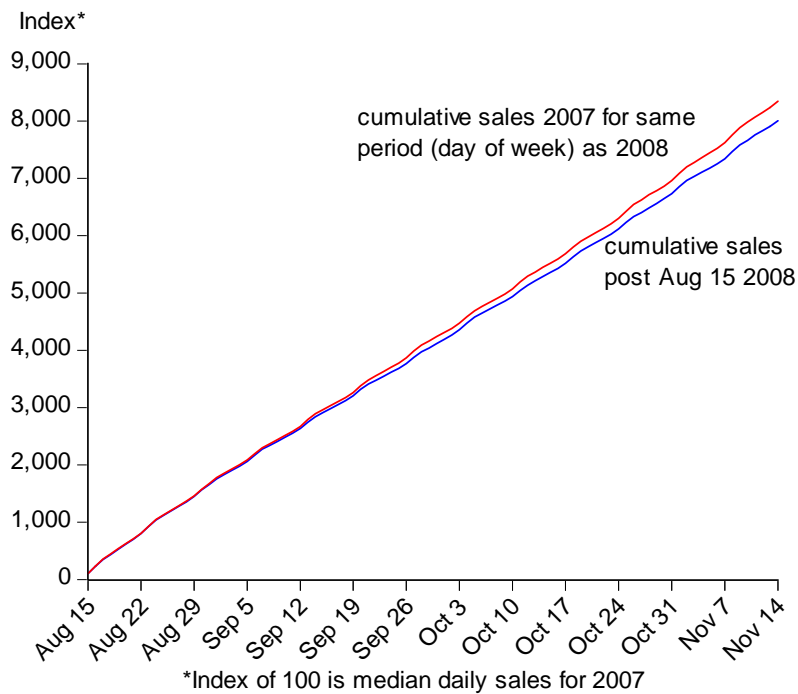


Figure 2. Cumulative Sales in August-November: 2007 versus 2008

To better visualize the growing gap between cumulative sales in 2007 and 2008, Figure 3 plots the gap itself. The green line in Figure 3 shows the gap, which is the difference between the red and blue lines in Figure 2. Observe in Figure 3 how the gap grew larger at a more rapid pace starting in September. The black solid line shows the trend in the month before the Lehman bankruptcy and extrapolates that trend through mid November. Clearly sales fell off sharply compared with that trend.

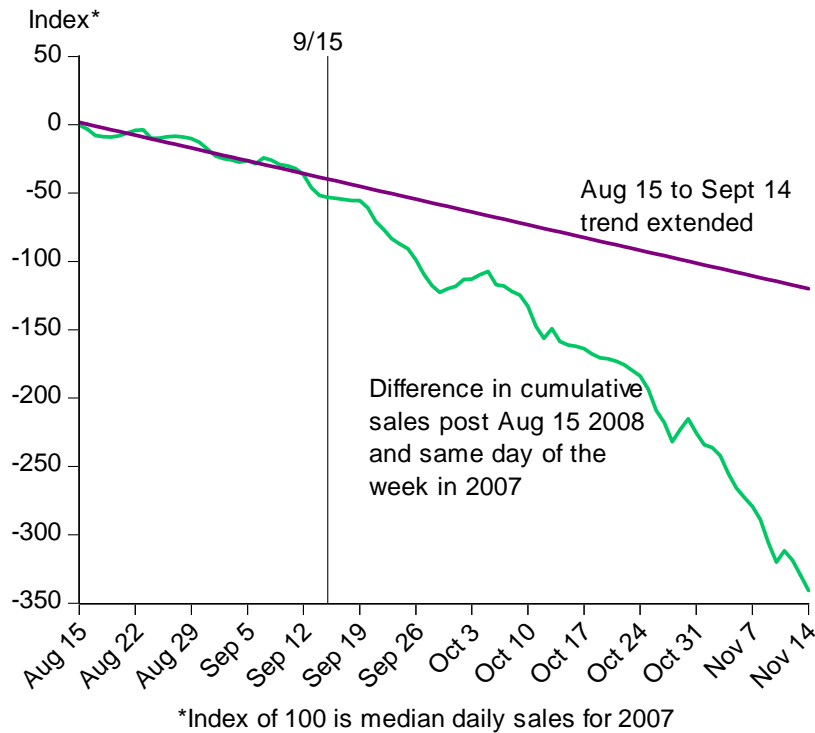


Figure 3. Pre-Crisis Trend versus the Actual 2007-2008 Difference in Cumulative Sales

Event Analysis

Can we pinpoint the timing and relate it to particular events associated with the financial panic? Consider the Lehman bankruptcy. After a weekend of tense behind-closed-doors negotiations, Lehman declared bankruptcy, and by Monday, September 15, 2008 the news was widely reported. September 15 is marked by the vertical line in Figure 3. Note that daily sales had dropped off during the week before the bankruptcy, but then held up relative to the 2007 pace for the rest of the week following the bankruptcy. A much more rapid decline in sales begins a week later, and then the decline picks up pace relentlessly with some minor pauses for the remainder of the period shown in the chart. Thus, there appears to be no immediate effect of the news of the Lehman bankruptcy on sales.

Do other events on other dates stand out? Other possible dates to examine include various policy announcements such as the Trouble Asset Relief Program proposed on Friday September 19, or the testimony and speeches about these responses the following week, or the heated congressional debate about the policy which spilled over into the presidential election campaign. While no one event clearly stands out as a sharp or significant daily movement in these data, the decline in retail sales deteriorated sharply as the various policy response played out during this period. The impact appeared to gain steam more steadily as bad news about the stock market and the whole economy was disbursed over several weeks.

Conclusion

Daily sales had been declining throughout 2008 compared to 2007 as the recession began just as the year 2007 drew to a close. But there was a noticeable acceleration in the decline from September to November 2008. The acceleration appeared to start before the Lehman bankruptcy, and there was no noticeable effect at the time of that bankruptcy or shortly thereafter. It was not until a week later that sales really began their precipitous decline in panic-like fashion that paralleled the panic in the financial markets. This was during the chaotic period that various government responses were being proposed, debated, criticized, and implemented, suggesting that these responses were themselves a factor. However, it is difficult to find a negative impact on sales of single events or dates during the panic. Rather there appears to have been a more cumulative, yet still very sharp, negative impact.