



Residential Parcel Deliveries: Evidence from a Large Apartment Complex

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B2C and Parcel Deliveries

Online sales have been the main driver of retail growth in recent years. Online retail sales (B2C) in the United States are growing at the rate of about 15% per year and accounted for 7.3% of total retail sales in 2015 (US DOC), which is 65% of all the growth in retail sales between 2014 and 2015. This trend has been accompanied by a growth in home deliveries of parcels since they represent the main mean over which online purchases are delivered to customers. Residential parcel deliveries tended to be uncommon a decade and a half ago, but have grown significantly in the last 5 years as B2C became a significant retail practice.

The parcel delivery market, also called CEP (Courier, Express and Parcel), is characterized by the time sensitivity of its shipments with consignments usually less than 70 pounds (32 kg) which are delivered on a door to door basis (Figure 1). There are different levels of service associated with a cost structure. Same day deliveries, if possible, are usually costly and done by specialized air or road services. Next day deliveries are offered in many metropolitan markets, again using specific and costly distribution channels. The most common parcel delivery service, deferred express, is when the carrier can provide an accurate delivery date once the point of pickup and delivery is known, usually between 3 to 7 days. Postal type deliveries commonly do not provide a specific delivery date, but usually deliver within 2 weeks.

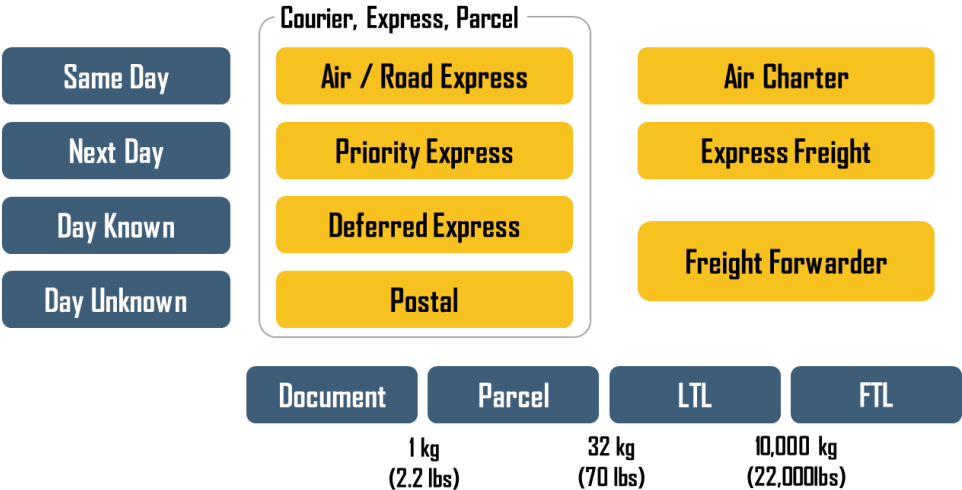


Figure 1: The Courier, Express and Parcel Market

Mail delivery in the United States undertook a notable transition. In spite of economic and demographic growth, total mail volume declined by 27% between 2005 and 2015 (Figure 2). This is in part attributable to a substitution to electronic forms of communication as well as decline in the use of mail for marketing purposes (e.g. adverts). Inversely, the emergence of e-commerce is associated with a growth of parcel deliveries, including USPS that delivered more than 4.5 billion units in 2015, a growth of 45% from 2010. The two other major carriers, UPS and FedEx, experienced a respective growth of 17% and 50% during the same time frame. The growth of home deliveries has incited online retailers such as Amazon to

enter the parcel delivery market since they are able to generate enough cargo to offer own account transport services.

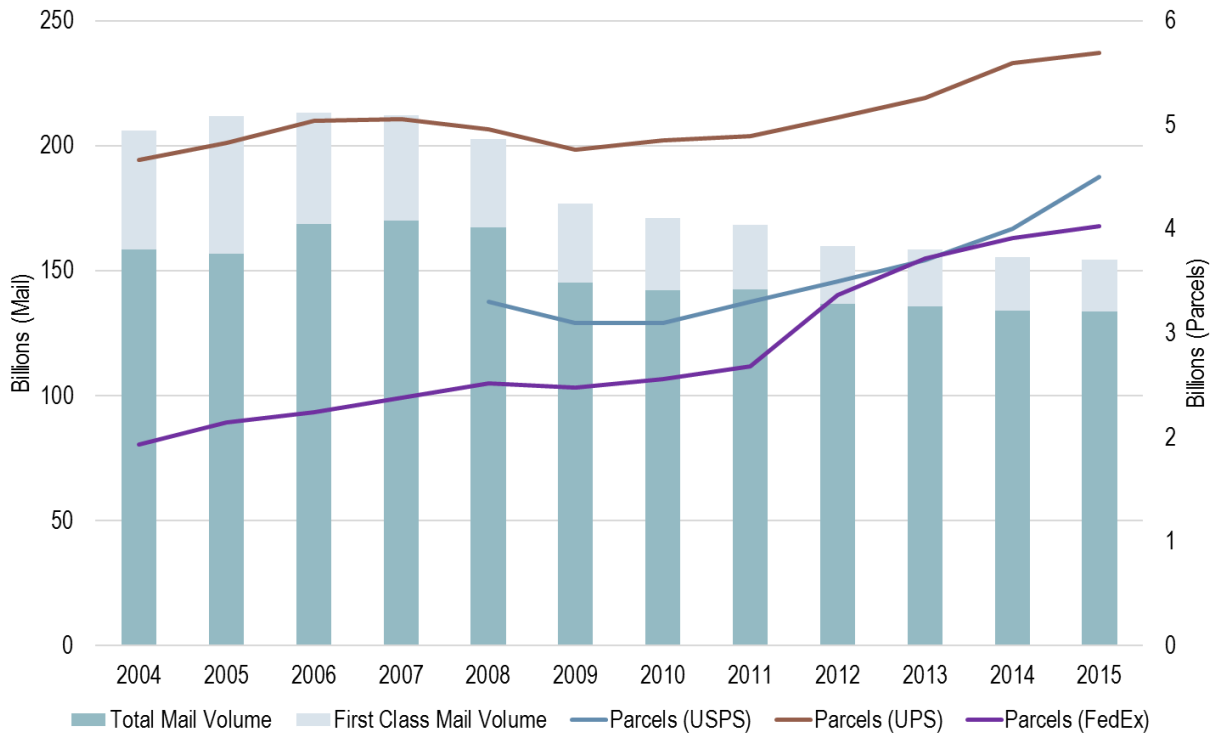


Figure 2: Mail Carried by USPS and Parcels Carried by Major Carriers, United States, 2004-2015¹

As the number of parcel home deliveries increases, all the major parcel carriers are trying to improve their last mile strategies, such as the use of specifically designed vehicles, better management software and the setting of sortation centers. These initiatives tend to be well covered in the literature. What is less known is the profile of these deliveries in terms of scale and frequency at the delivery point. These points can range from individual family homes, locker banks and apartment buildings. How many deliveries are generated by residential facilities? To provide a partial answer to this query, surveying individual apartment buildings can be revealing since they include in one location a large number of consumers and the possibility to tally these deliveries. With a large enough number of residents, one apartment building could be representative of a whole area in terms of B2C consumption patterns while the same observation obviously cannot be made from one single family home.

Facility and Data Collection

A building of about 300 apartment units with 800 residents was surveyed. It is located in Northern New Jersey, in the inner suburbs of New York, a neighborhood characterized by an upper middle income (median income of \$67,000) with the two most significant ethnic groups being whites (43%) and Asians (40%). The building has a 24/7 concierge service. The conventional role of a concierge is to provide a

¹ Sources: USPS. UPS and FedEx, Annual Reports. Packages shipped by FedEx ground and FedEx express. UPS involves US domestic parcel operations. First-class mail is used for postcards, letters, large envelopes, and small packages weighting less than 13 ounces. Total mail volume includes standard mail (or bulk), which usually consists of flyers, circulars, advertising, newsletters, bulletins or catalogs.

level of security by monitoring the access of a building, screening visitors and offering general assistance services to residents. A concierge is also responsible for receiving packages on the residents' behalf, particularly in their absence, a role that has substantially expanded with the growth of B2C and its resulting home deliveries. In such a facility, there are no unattended deliveries, which is different from the majority of residential parcel deliveries, such as for a single family home, that have a risk of being unattended because occupants may be at work or involved in other out of home activities.

For apartment complexes, this is inciting the setting of procedures to receive parcels, store them and inform occupants that their consignments are available for pick up. Because of this, many residential buildings have become small freight stations as the last buffer point for B2C transactions. Under such circumstances, a growing amount of deliveries end up using the lobby as a distribution center (an informal freight station as shown on Figure 3); a buffer between the delivery schedules and the availability of residents to collect them. For parcels and goods delivery companies, this is a very efficient system as it guarantees uninterrupted supply chains (ability to deliver to the consignee) and a continuity of deliveries. The delivery truck is insured of being able to drop all the cargo bound to a specific address because there will always be someone available to act as a consignee.



Figure 3: Parcels Waiting to be Picked Up in the Lobby of the Surveyed Facility

In the surveyed facility, parcels cannot be delivered to individual apartments and must be received by the concierge, who identifies on a log sheet the carrier, the number of parcels bound to a consignee

along with his/her name and apartment unit. Then, a small notification slip is left in the consignee's mailbox, informing that a parcel is available to be picked up at the front desk. Therefore, log information for each parcel delivered to the apartment building is kept on record. Bulky deliveries such as furniture or groceries are not tabulated and are delivered directly to the consignee's apartment during daytime. Monthly logs were available for the 12 months of 2016, in addition to 3 comparable months (January 2015, 2016 and 2017). This is an extensive sample that is expected to provide representative results.

Scale and Scope of Parcel Deliveries

For 2016 (January to December), a total of 23,613 parcels were delivered. This accounts for 1,967 deliveries per month, 454 deliveries per week and 65 deliveries per day. On a per apartment unit basis, 1.53 parcel deliveries were done per week. Based upon the size of the sample, it is suggested that 1.5 parcel deliveries per week per apartment can be used as a parameter for freight traffic generation models in a similar socioeconomic context (middle to upper middle class neighborhoods). Alternatively, each resident generates about 0.5 to 0.6 parcel deliveries per week.

Comparing parcel deliveries between January 2015, 2016 and 2017 revealed an annual growth of 17%, which is much in line with the 15% annual growth of online retail sales in the United States (US DOC). This further underlines the representativeness of the sample.

Weekly Deliveries

The observed frequency of parcel deliveries during weekdays is relatively uniform with an increase until the Wednesday peak of 19% of all deliveries and then a gradual decline (Figure 4). Only 14.4% of parcel deliveries are made on weekends, with Sundays being the lowest day (2.3% of all deliveries). This can be indicative that many online purchases are made during the weekend and can thus be delivered by the middle of the following week, which corresponds to the peak of deferred express deliveries.

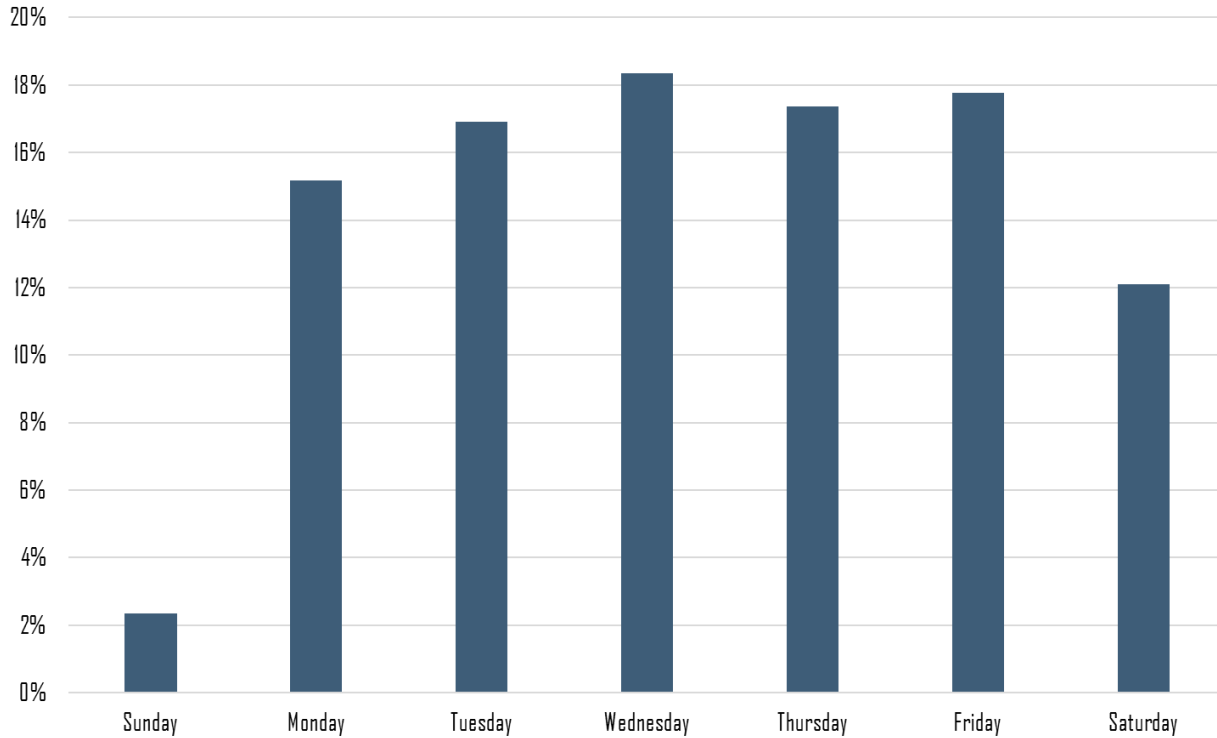


Figure 4: Weekly Delivery Frequency of Parcels for the Sampled Apartment Complex, 2016

Parcel deliveries are still dependent on the commercial operations of the carriers and less so on the requirements of consumers. This is also influenced by the availability of a concierge, implying that deliveries can be done to maximize the operations of carriers without the risk of unattended deliveries. Weekend deliveries remain an underutilized opportunity, particularly on Sundays. Still, the volumes at this point may not be sufficient enough to fully justify Sunday deliveries. It is expected with the ongoing double digit growth of B2C that the prevalence of Sunday deliveries will substantially increase in main metropolitan markets. This would support the growing consumers' expectations about the frequency and reliability of home deliveries while enabling carriers to increase their volumes without a significant increase in their capacity (e.g. number of delivery trucks).

Monthly Deliveries

The monthly frequency of deliveries (Figure 5) is in line with the retail cycle, with November and December being the peak months (9.1% and 11.8% respectively) and February accounting for the lowest number (7.4%). For the rest of the year, the frequency is quite consistent, underlining that home deliveries support a wide array of consumption, from discretionary (peak in November and December) to standard such as food items (home deliveries of food and groceries has grown substantially), seasonal clothing or electronic goods.

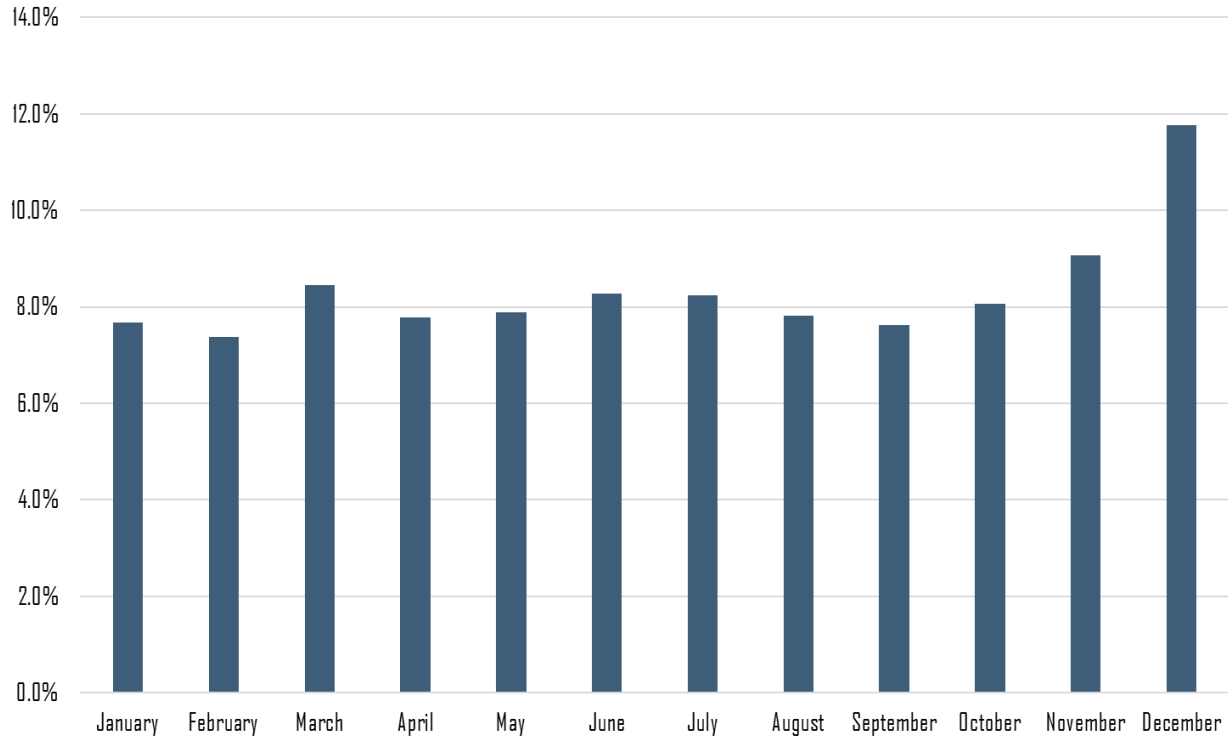


Figure 5: Monthly Delivery Frequency of Parcels, 2016

Figure 6 is a further disaggregation of home deliveries on a weekly basis over an entire year and one month (January 2016 to February 2017). The surge around Christmas is particularly evident with home deliveries 51% higher than the annual average (680 deliveries per week as opposed to an average of 450). The lowest weekly frequencies are usually the week around major federal holidays such as Memorial Day (end of May), the 4th of July, Labor Day (early September) and Columbus Day (early October). Evidence underlines that during federal holidays many consumers are using this opportunity to buy goods physically because of the time availability. In such a context, time scarcity appears to be a driver on online purchases and the associated home deliveries.

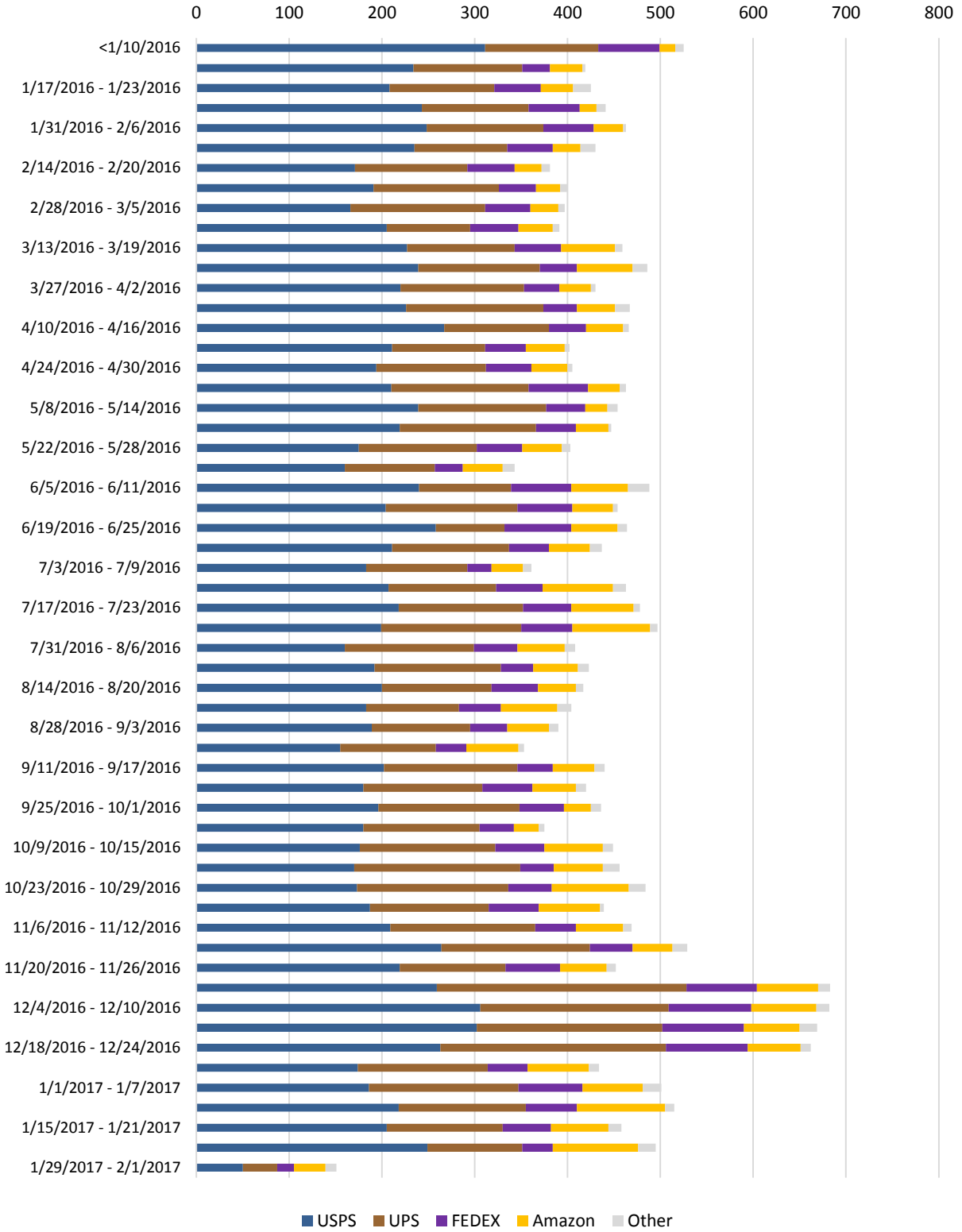


Figure 6: Weekly Parcel Deliveries by Carrier, 2016

Carriers

Since the log sheets are identifying the carrier for each parcel delivery, their respective share was tabulated. The United States Postal Service still accounts for 47% of all parcel deliveries, underlining the importance of a low cost alternative (Figure 7). Many online retailers try to minimize shipping costs and the default option is often USPS, but delivery times for such an option can be above one week, which fits the expectations of many consumers. Still, the performance of USPS deliveries is improving for deferred express deliveries, underlining its enduring dominance as a carrier. The specialized parcel companies, UPS and FedEx, account for 30% and 11% of deliveries respectively. They usually fill the niche of the deferred express deliveries.

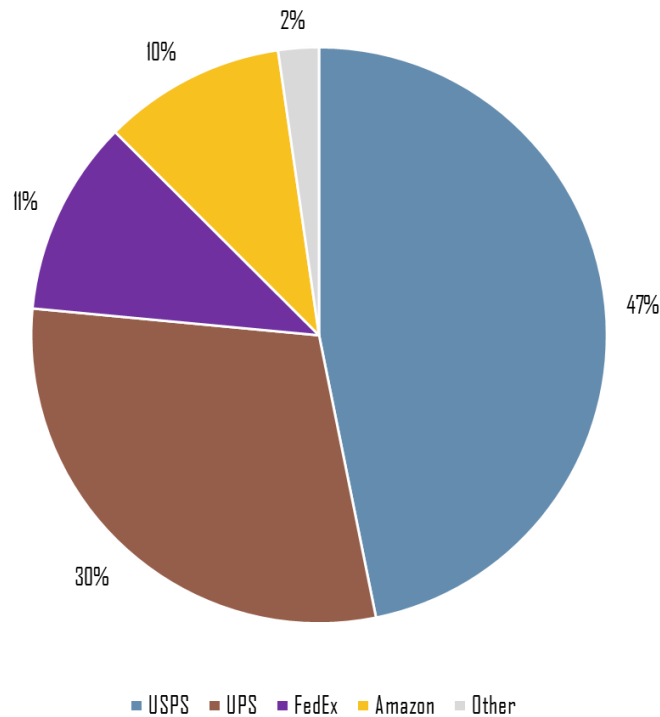


Figure 7: Parcel Deliveries by Carrier for the Sampled Apartment Complex, 2016

The emergence of Amazon is of interest. In 2015, the giant online retailer directly entered the own account transport market for parcel deliveries, which is a process of vertical integration. Amazon generates enough volume to undertake this approach in large metropolitan areas, including New York. Further, in 2016 Amazon started its own dedicated air cargo operations by leasing 20 Boeing 767 freight planes and reopening the former DHL air hub in Wilmington, Ohio, which closed in 2009 when the carrier decided to rationalize its North American operations. With the setting of its own sortation centers near major consumption markets, parcels are routed to individual post offices or to Amazon's own delivery vehicles. Therefore, Amazon is now competing directly with long established parcel delivery players with the additional advantage being that Amazon is a generator of cargo, not only a carrier.

The month of January 2015 revealed no deliveries made directly by Amazon, while for the sample in 2016 it accounted for 10% of the parcel deliveries. It remains to be seen if the market share of Amazon in parcel deliveries will increase, but the prospects are positive since it accounted for 6% of the parcel deliveries in January 2016 and for 14.7% of the deliveries in July of the same year.

Based upon the market share of carriers, it can be suggested that about half the online purchases are more cost sensitive for their delivery (postal) and that the other half is more time sensitive (deferred express).

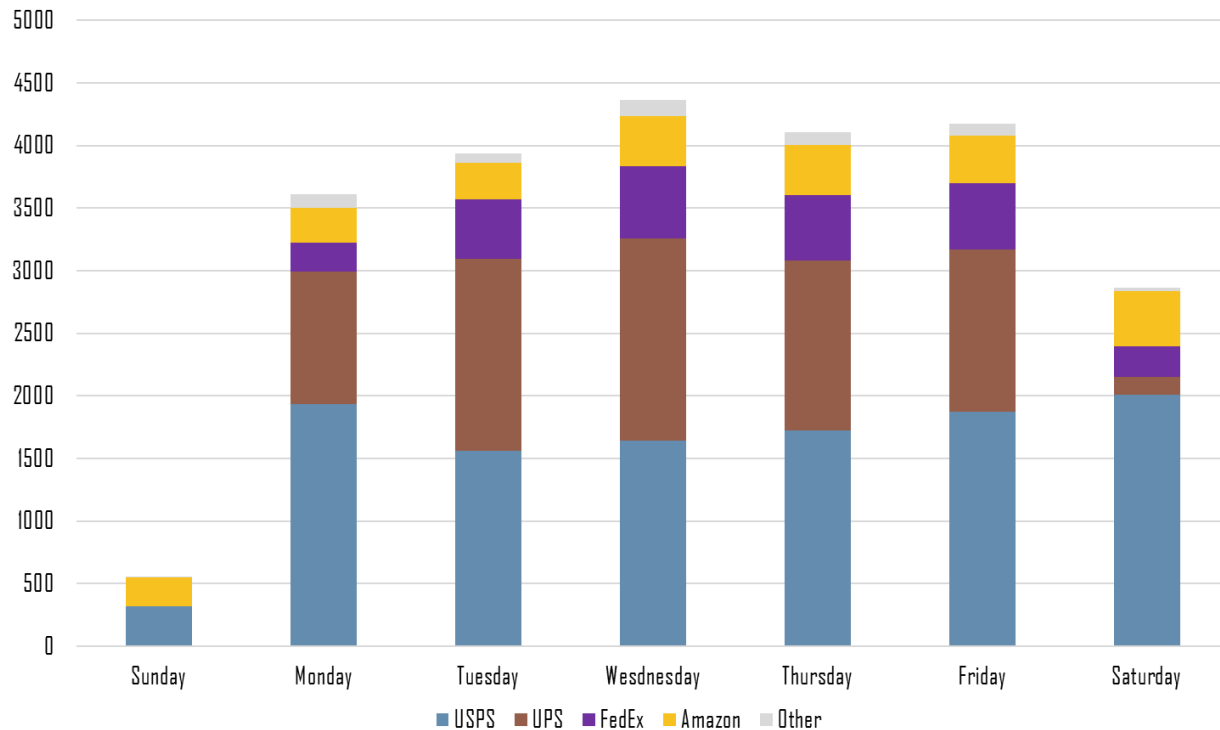


Figure 8: Parcel Deliveries by Carrier by Day of the Week for the Sampled Apartment Complex, 2016

The most consistent parcel deliveries are made by USPS, which accounts for 76% of all weekend deliveries (Figure 8). UPS only delivers during weekdays, while FedEx does not deliver on Sundays. The limited number of Sunday deliveries was accounted for by USPS and Amazon. Amazon is the only private carrier delivering every single day, which is reflective of its online 24/7 commercial availability. The sample underlines that Amazon entered the parcel delivery market to improve the frequency of its deliveries since carriers such as UPS and FedEx appear unwilling to offer these services over the weekend in the sampled building.

Conclusion

With the growth of B2C, apartment buildings are now generating a large number of parcel deliveries. Based upon the collected sample of a 300 unit apartment complex over a period of more than one year (2016 entirely covered), the following observations can be made:

- Each apartment unit generates about 1.5 parcel deliveries per week. This is about 0.5 to 0.6 deliveries per resident per week.
- Comparing January 2015 with January 2016 and January 2017 reveals a consistent annual growth of 17% of parcel deliveries, which is in line with the 15% annual growth of online retail sales in the United States.
- Parcel deliveries during weekdays are relatively uniform with an increase until the Wednesday peak of 19% of all deliveries.

- Only 14.1% of parcel deliveries are made on weekends, with Sundays being the lowest activity day (2% of all deliveries).
- The months of November and December are peak periods for home deliveries, with 20.9% of all deliveries.
- February is the month of lowest activity with 7.4% of home deliveries.
- There is a notable decline of home deliveries in the week around major federal holidays such as Memorial Day, the 4th of July and Labor Day.
- The United States Postal Service still accounts for 47% of all parcel deliveries.
- The specialized parcel companies, UPS and FedEx, account for 28% and 11% of deliveries respectively.
- Amazon is a new entrant that accounts for 11% of all parcel deliveries and the only private provider offering 7 day deliveries.

Acknowledgment

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