LOGISTICS FACILITIES IN THE AGE OF TECHNOLOGICAL CLIMATE CHANGE

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The secular changes taking place in the distribution ecosystem are having a positive impact on logistics properties in marked contrast to the trials facing U.S. retail. The trajectory of logistics properties, defined as facilities used for the warehousing and distribution of goods, is soaring by any measure. Rents are increasing, vacancies declining, values rising, industrial REITs outperforming other REITs and logistics and delivery jobs are increasing faster than for total U.S. employment. For the first time in Association of Foreign Investors in Real Estate's (AFIRE) 25-year survey, the industrial category is considered the number one property type by foreign real estate investors.[1] Logistics facilities are typically used for: business to business distribution, retail store distribution and business to consumer/e-commerce fulfillment. It is not uncommon for multiple uses to occur within a facility.

Logistics demand velocity now exceeds the U.S. economy by a ratio of 2:1 as logistics demand growth approaches 4% whilst GDP growth is approximately 2%. Historically, the relationship was close to 1:1. The main catalyst for excess absorption is e-commerce which has caused a structural shift in the marketplace. Supply and delivery methods have been altered. The background for this revolution is the technological climate change that manifested itself starting with the advent of the World Wide Web in the 1990s and the subsequent launch of the I-phone in 2007 and the I-Pad in 2010. The technological change impacting the supply chain has also been accelerated by Big Data gleaned from multiple sources.

Rents Rising and Vacancy Down

Logistics, which includes warehouse and distribution facilities, but not light industrial, experienced an asking rent increase of 6.9% year over year ending Q2 2017, 23% since Q1 2014, and 32% since Q4 2011. The vacancy rate has declined to 6.6% from the 13.1% recorded in Q4 2010 and is the lowest it has been since 1982[2].

Once shunned older and somewhat inefficient warehouse properties situated close to or within cities are now in demand as potential Last Mile[3] distribution facilities. According to CoStar the vacancy rate for such properties has declined to 3.6% as of year-end 2016 and contributed to the overall historically low vacancy rate. These locations offer immediate proximity to metro populations via major transportation arteries which appeal to rapidly growing e-commerce and Last Mile users[4]. Rents for these types of properties rose 9.8% year over year from the year end 2015 to year end 2016, higher than the 7.1% rent growth in the overall logistics market.

Another recent trend is the increase in the number of mega warehouses, which are facilities with at least one million square feet. According to CBRE from 2010 to 2016, 117 mega warehouses were built, for a total of 141.2 million square feet. Twenty-nine more facilities are currently under construction. Since 2010, nearly 90 million sq. ft. of these mega facilities have been completed in the top 10 markets. An additional

[1] James Fetgatter, "US RE Grabs Foreign Investors' Intentions! 95% Will Maintain or Increase Investment Levels in 2017", Association of Foreign Investors in Real Estate (AFIRE), January 3, 2017
[2] CoStar
[3] Sometimes referred to as Shallow Bay or Infill Warehouse, these facilities are situated close to or within major population centers. They are typically older and smaller than modern facilities. Their most important positive attribute is their infill location
[4] For the purposes of this data, CoStar considered the top 10% of 50K-250K SF industrial buildings in each metro according to their closeness to population. They based the parameters on a case study of Amazon's last-mile distribution portfolio.

31.6 million sq. ft., with 60% pre-commitments, is under construction and scheduled for delivery by year-end 2018[5].

Values Up

According to RCA CPPI, which measures property value appreciation, the industrial sector has outperformed other sectors except apartments over the past 24 months.

Table 1 - Change in CPPI Through July 2017

Property Type	6 Month	1 Year	2 Year	3 Year	4 Year	5 Year	10 Year
Office	6.5%	11.1%	15.6%	33.8%	57.7%	77.3%	29.4%
Office - CBD	10.5%	15.4%	20.3%	42.3%	66.9%	96.4%	71.1%
Office - Sub	2.5%	6.7%	10.8%	25.5%	48.4%	59.4%	-2.8%
Industrial	**5.2%**	**8.7%**	**19.4%**	**31.2%**	**55.7%**	**62.0%**	**16.5%**
Retail	0.6%	-1.6%	5.7%	19.0%	31.1%	52.0%	-3.1%
Commercial	4.6%	7.0%	13.5%	29.2%	49.6%	67.2%	18.1%
Apartment	4.7%	10.1%	24.6%	43.7%	65.5%	86.1%	60.2%
All Types	**4.6%**	**7.9%**	**16.7%**	**33.3%**	**54.2%**	**72.6%**	**28.7%**
6 Major Metros All Types	7.3%	10.7%	18.5%	37.2%	60.9%	80.9%	52.5%
Non-Major Metros All Types	2.2%	5.5%	15.1%	29.8%	48.4%	65.6%	10.8%

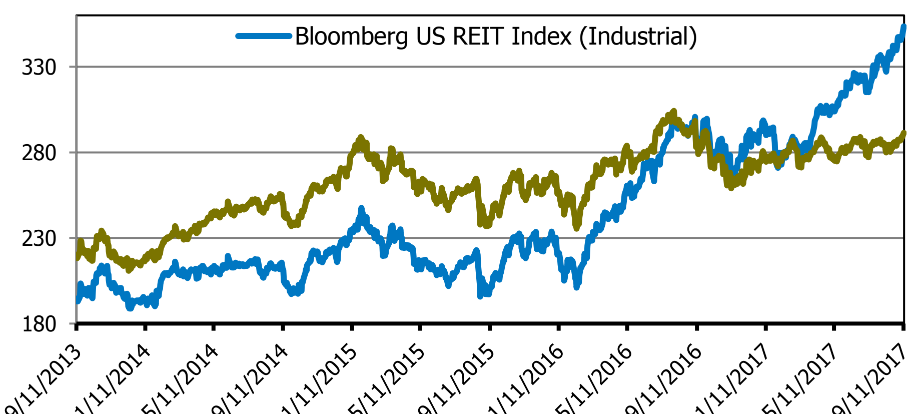
Source: Real Capital Analytics

There is particular buyer interest for infill location portfolios. Some of the older and less desirable properties are now aggressively sought to provide capacity for Last Mile e-commerce facilitation.

Industrial REITs Outperform Peers

With demand for logistics space on the rise, shares of Prologis and peers such as DCT Industrial Trust and STAG Industrial are outperforming other North American REITs, as well as the broader stock market. As exhibited below, the Bloomberg U.S. Industrial REIT index significantly outperformed the Bloomberg U.S. REIT Index over the past year.

Table 2 - U.S. REIT Performance (All Types and Industrial)



Source: Bloomberg

[5] https://www.cbre.us/research-and-reports/US-MarketFlash-Thanks-a-million-mega-industrial-warehouses

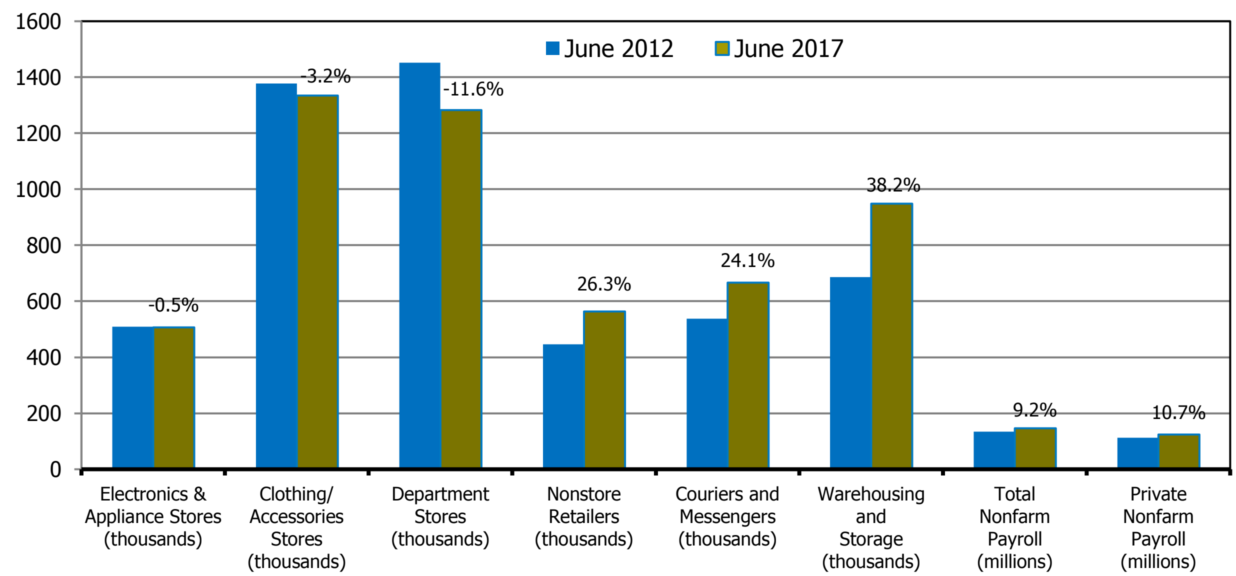
The five largest industrial REITs, Prologis, Duke Realty, Liberty Property, DCT and First Industrial, raised forecasts for 2017 same-store net operating income growth after stronger-than-expected 2Q results. Their forecasts average 4% for 2017, reflecting peak occupancy and continued, stronger-than-expected rent increases, despite supply more closely matching demand. Prologis[6] expects same-store NOI to rise 4.5-5.25% in 2017.

Number of Jobs Associated with the Logistics Sector Increasing

As a proxy for tracking the migration of product distribution demand from retail to logistics, consider the change in the number of jobs in various sectors. The number of warehouse, storage, delivery, and non-store retail jobs are increasing while several categories of retail jobs decline. Over the past year ending June 2017 total non-farm payrolls increased 1.6% and total private payrolls increased 1.7%. During the same time period warehousing and storage jobs increased 3.9%**.** Similarly, under the transportation and warehousing category, courier and messenger jobs increased 4.9%. In contrast, jobs fell amongst retailers most exposed to competition from e-commerce such as the sporting goods, hobby, book, and music store category (-2.4%), department stores (-1.8%), electronics and appliance stores (-3.9%), general merchandise stores (-1.0%), and clothing and clothing accessories stores (-1.0%). Nonstore retailers (up 5.1%) were the best performing retail category consistent with the growth of e-commerce and accelerated demand for logistics space.

The data was even more definitive over the past five years ending June 2017. Total non-farm payrolls increased 9.2% and total private payrolls increased 10.7%. During the same time period warehousing and storage jobs increased 38.2%**.** Similarly, under the transportation and warehousing category, courier and messenger jobs increased 24.1%. In contrast, net year over year job changes amongst retailers such as the sporting goods, hobby, book, and music store category (-2.2%), department stores (-11.6%), electronics and appliance stores (-0.5%), general merchandise stores (-2.7%), and clothing and clothing accessories stores (-3.2%) were negative. Nonstore retailers (up 26.3%) were the best performing retail category**.**

Table 3 - Job Count by Sector

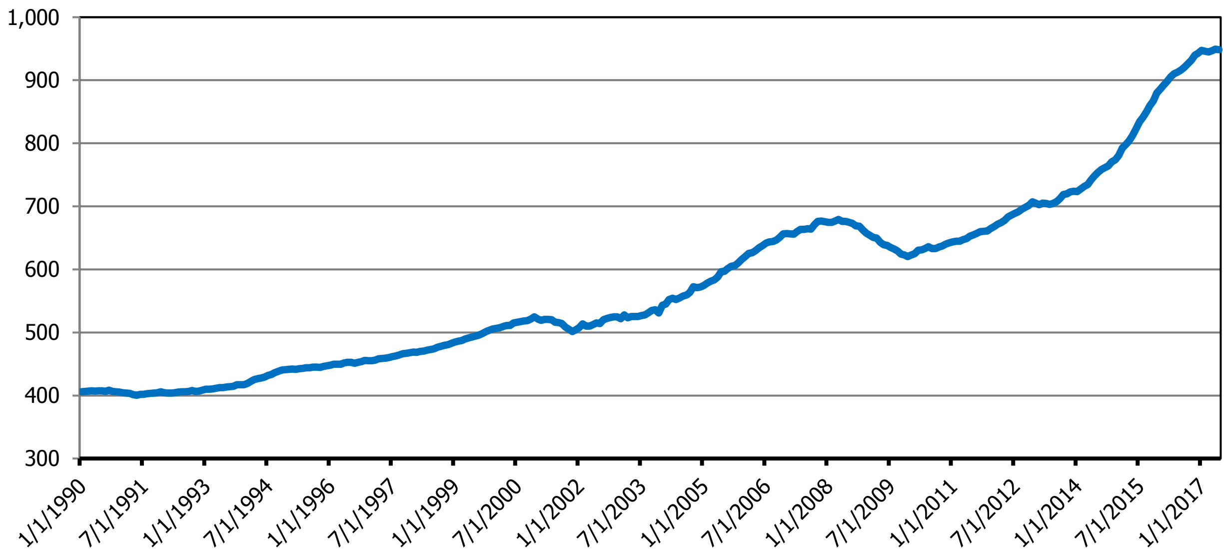


Source: Bureau of Labor Statistics

[6] Prologis is the largest industrial REIT, with 678 million square feet of owned and managed warehouse assets around the world, more than 5x the size of its nearest peer.

Total employment is up 6.0% since June 2007 and 9.2% over the past five years. Total private sector employment is up 7.1% since June 2007 and 10.7% over the past five years. In contrast, Warehousing and Storage employment is up 43% since June 2007 and 38% over the past five years.

Table 4 - Warehousing and Storage (thousands)



Source: Bureau of Labor Statistics

Per CBRE, e-commerce fulfillment centers require two to three times as many workers as traditional warehouses. Mega warehouses can employ as many as 1,000 workers. Some newer Amazon facilities have 2,000 or more full-time employees. A manifestation of this trend is witnessed by the Amazon conducted August 2017 jobs fair, which aimed to hire 50,000 workers at 12 U.S. fulfillment center locations as part of Amazon's pledge to hire 130,000 workers by 2018.

Warehouse workers are experiencing the biggest wage gains in at least a decade[7]. According to ProLogistix, starting pay for warehouse workers rose 6% over the past year to $12.15 an hour in February compared to 2.8% across all professions over the same period, according to the Labor Department's Bureau of Labor Statistics.

Couriers and messenger employment is up 14% since June 2007 and 24% over the past five years. This reflects the rise in demand for home delivery which requires more workers than a bulk delivery to department stores.

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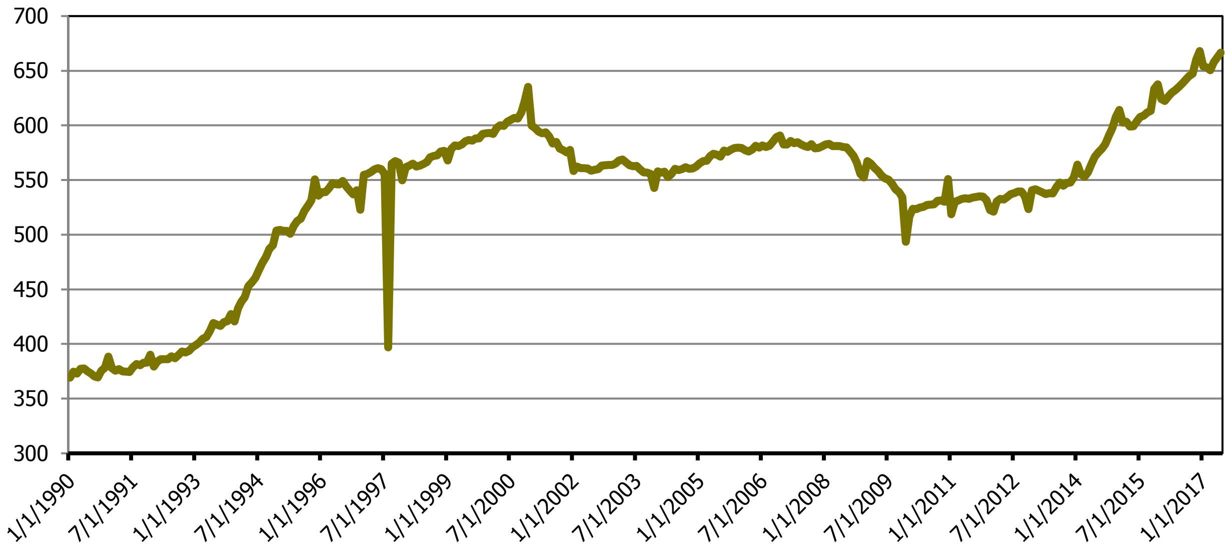
[7] Jennifer Smith," U.S. Online Retailers' New Warehouses Heat Up Local Job Markets", Wall Street Journal, April 9, 2017

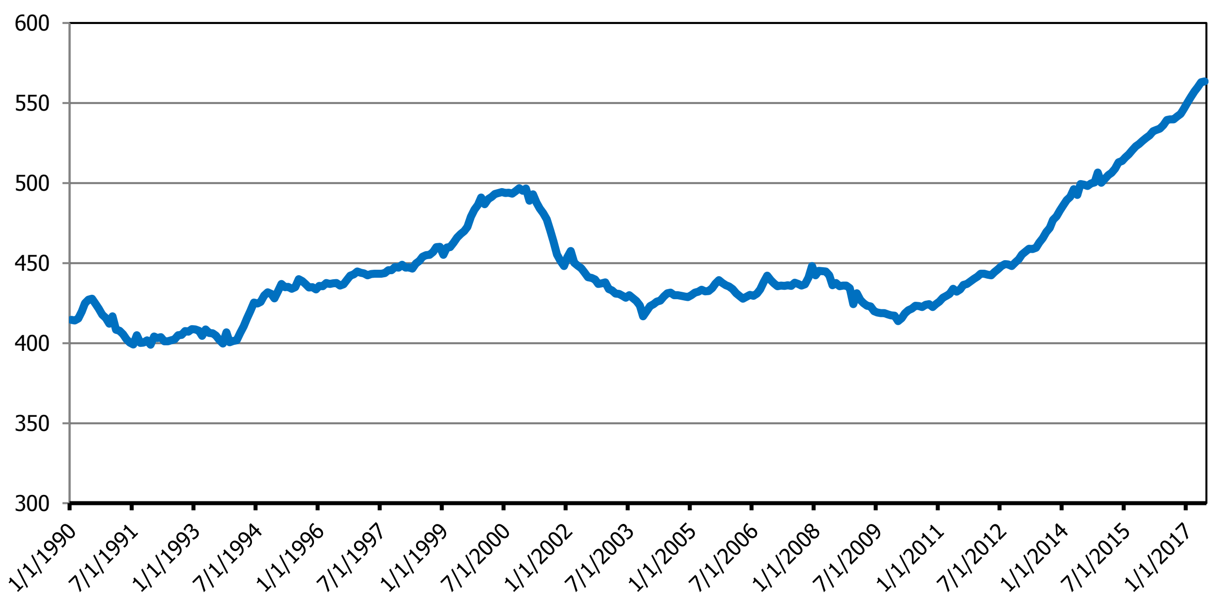
Table 5 - Couriers and Messengers (thousands)



Source: Bureau of Labor Statistics

Non-Store Retailer employment is up 29% since June 2007 and 26% over the past five years. While this sector has existed for many years and manifested itself in the form of catalogues, telephone, and mail order commerce, technological change in the form of the internet and hand held devices has enabled this significant increase.

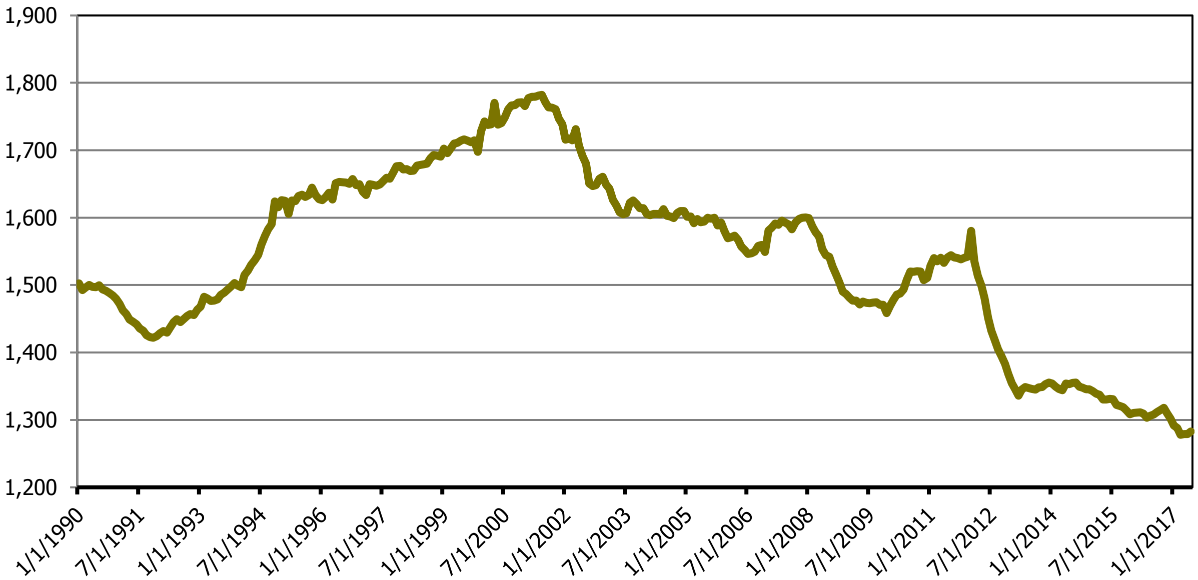
Table 6 - Nonstore Retailers (thousands)



Source: Bureau of Labor Statistics

Department Store employment is down -19% since June 2007 and -26% over the past five years.

Table 7 - Department Stores (thousands)



Source: Bureau of Labor Statistics

Accelerated Demand Generation Spawned by Change

The primary demand growth accelerator for logistics space in the past two years has been e-commerce. Secondary generators include population shift, import redirection, and to a much lesser extent, cannabis legalization.

E-Commerce

The product distribution ecosystem is evolving and the gale of creative destruction[8] described by Joseph Schumpeter has been let loose on physical retail. In his seminal book titled "Capitalism, Socialism and Democracy", Schumpeter wrote that "Capitalism is by nature a form of economic change" and that "the capitalist engine stays in motion to form new consumers' goods, new methods of production, transportation, new markets, new forms of industrial organization".[9] Those words can describe what is happening to goods distribution with the added back drop of almost unprecedented technological change. Technology is changing the logistics chain beginning at the manufacturing stage, to shipping and eventually to fulfillment

E-commerce Requires More Space

U.S. product imports is an important driver of logistics demand. The redirection of the way products are delivered to the consumer from physical stores to e-commerce has been the primary catalyst of the change and has resulted in the increased rents, lower vacancies, increased values and outperforming stock prices. When demand gets transferred from physical stores to e-commerce it does not convert at parity, but rather a ratio that varies by type of good but averages about 1 SF:3 SF. Industrial REITs Prologis and Duke Realty estimate that e-commerce requires about 3x the amount of warehouse space as physical retail[10]. About one million square feet is needed for every $1 billion in e-commerce sales.

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[8] Joseph Schumpeter, "Capitalism, Socialism and Democracy" published in 1942. The concept was first noted by Werner Sombart in his 1913 book titled "Krieg und Kapitalismus" (War and Capitalism) published in 1913.
[9] Joseph Schumpeter, (1994), [1942] "Capitalism, Socialism and Democracy", London, Routledge. pp. 82–83
[10] Prologis expects the 3X multiplier to decline over time as customers become more efficient and online sales cannibalize some of the space required by bricks-and-mortar retailers.

Prologis maintains that approximately 215 million square feet of warehouse space will be added industrywide in 2017, and 225 million in 2018. Duke posits that roughly 300 million square feet of warehouse space may need to be developed in 2017-20 to meet demand just from e-commerce.

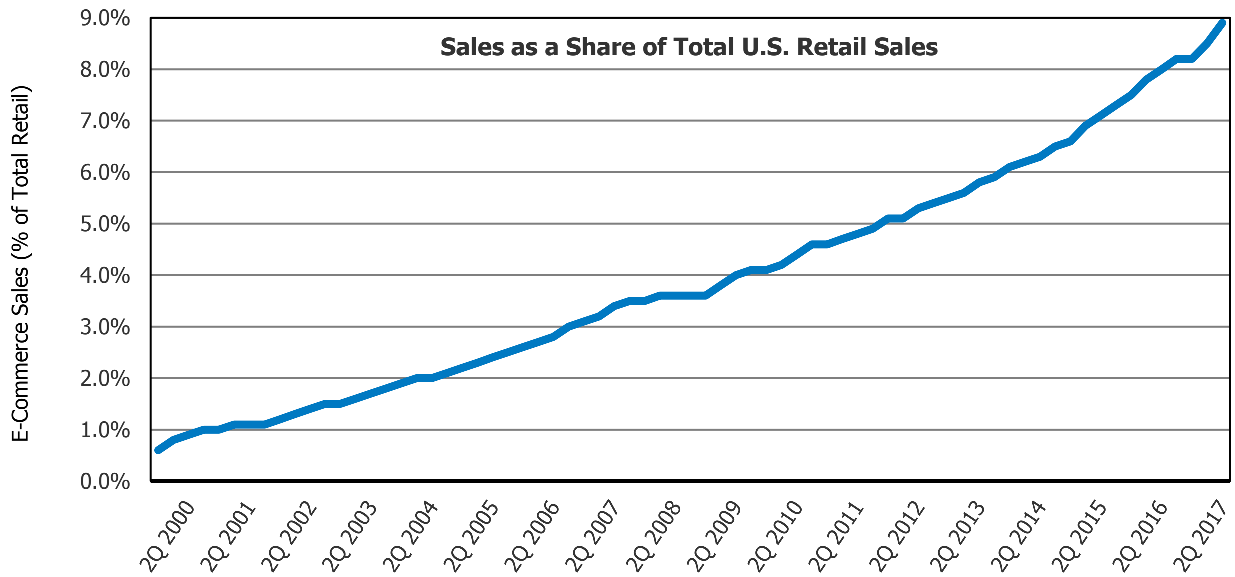
Hosting e-commerce functions require 20% more[11] warehouse and distribution space than used by traditional retail merchants in their warehouses. E-commerce focused logistics needs to accommodate single-packed products, wider product variety, robotics, and more employees than found at traditional retail outlets. Every $1 billion of e-commerce sales drives demand for one million square feet of industrial real estate space compared to 830,000 square feet of warehouses serving store deliveries according to Bryon Blaylock of PWC. It takes more warehouse space to house small-order e-commerce fulfillment than it does to accommodate large shipments to stores.

The logistics space used for e-commerce is used intensely, needs to accommodate large inventories and requires enough space to accommodate more workers than typical logistics space. There is also a heavy concentration of robotics that is space intensive as well. For example, Amazon announced that it planned to open a new 850,000-square-foot, high-tech fulfillment center in Orlando, FL in 2018. Amazon said it plans to add 1,500 full-time jobs for employees working alongside various automated amazon robotics functions to pick, pack and ship small items like books, electronics and consumer goods.

E-commerce Growth Rate Exceeds Total Retail

The growth rate of ecommerce sales has far outstripped total retail sales since 2000. Online shopping has grown in the US at an annual rate of approximately 15% since 2009 compared with physical store sales of just 3.5%. E-commerce's share of total domestic retail sales has expanded from 2% in 2004 to 8.5% as of Q1 2017. This represents over 50 consecutive quarters of share growth and the share has not contracted quarter-to-quarter since the Census Bureau started tracking the metric in 1999.

Table 8 - Seasonally Adjusted Estimated E-Commerce



Source: US Census

However, these numbers do not reveal the full impact. When discounter/dollar stores are excluded the figure rises to 15.5%. Apparel & Accessories share of online sales to total sales was 18.0% in 2016 compared to 4% in 2004. Since total apparel category growth was up 2.1% in 2016, online sales accounted

[11] Byron Carlock, U.S. Real Estate Leader at PWC as quoted by Rani Molla and Shelly Banjo "Store Closings Have Industrial-Sized Silver Lining", Bloomberg, August 17, 2016

for 145.7% of total apparel & accessories growth, implying physical store sales were down -1.2%. according to Deutsche Bank and based on company reports.

E-commerce is the driving force of the outperformance of logistics real estate. E-commerce accounts for about 30% of industrial REIT new development projects. Within the Prologis portfolio, e-commerce leasing accounts for approximately 20% of new leasing, up from less than 5% five years ago. This growth has been driven by a combination of growth in the e-commerce industry and the intensity of warehouse use of the activity.

Jones Lang LaSalle estimates that 30-40% of demand for industrial real estate has some type of connection to e-commerce. Although e-commerce accounts for less than 15% of Prologis' square footage, it's about 30% of new development. According to Duke Realty e-commerce constitutes approximately 40% of its $734 million development pipeline. E-Commerce has become so prominent that Prologis's largest tenant, Amazon, occupies about 15 million square feet and represents 3.1% of net effective rents surpassing several third-party logistics providers, transportation companies, Home Depot, and Wal-Mart. In 2012, Amazon was Prologis' fifth-largest tenant, behind four logistics providers, at less than 1% of rent. Prologis's second-largest tenant, DHL, occupies 10.4 million square feet and accounts for 1.6% of net effective rents. Amazon is also the top tenant for both Duke Realty (4.3% of rent) and DCT. E- Commerce is likely to boost annual demand for industrial space by 20 percent in the next few years, according to Green Street Advisors.

Amazon

Amazon's mastery of efficiency and data gives it a distinct advantage that smaller players can not match. Amazon's made a significant investment and spent years in trial and error analysis.

According to Slice Intelligence, Amazon accounted for 43%[12] of all online retail sales in 2016[13]. More importantly, Amazon accounted for 53% of the growth in U.S. e-commerce sales for the year. Consequently, the online e-commerce giant is a significant demand generator for warehouse space accounting for over half the fulfillment centers in the U.S., according to real estate research firm Green Street Advisors.

Amazon has more than 70 fulfillment centers in the U.S., including 26 that were added in 2016. Amazon began adding bulk distribution fulfillment centers ranging from 500,000 to one million square feet or more in1999. According to CoStar Portfolio Strategy, Amazon began building sortation centers averaging roughly 300,000 square feet in certain markets in 2009, followed in 2013 by delivery stations of roughly 100,000 square feet and Prime Now hubs of 50,000 square feet in major population centers. Amazon has been adding 15 million SF per year – they are expected to repeat this for the next 5-6 years and total 100 million SF – doubling in the next 5 years.

According to Bloomberg Intelligence and based on company 10Q reports, Amazon leases about 97 million square feet in fulfillment and data centers in North America, in addition to the two million square feet it owns, almost 3x the amount in 2012.

Amazon's logistics footprint is expected to expand further. Amazon recently surpassed Wal-Mart as the world's second biggest consumer electronics retailer. Amazon's apparel sales grew 294% since 2011 and it is now the second largest apparel retailer. In contrast department store retailers Sears and JCPenney lost a substantial share of apparel sales at-44% and -27% respectively.

Other E-Commerce Users

Other important U.S. e-commerce retailers such as Ebay, Wayfair and Blue Nile have grown rapidly. E-Commerce has also spurred space demand amongst package delivery companies including UPS, FedEx and DHL. Other companies prefer being proximate to these establishments as it enhances their logistical abilities. FedEx leases 51% of the total Monmouth REIT logistics space.

[12] BI Intelligence, Amazon accounts for 43% of US online retail sales", Business Insider, February 3, 2017

[13] Report released January 2017 study, which analyzed more than 4 million online purchases

Traditional physical store retailers such as Home Depot, Wal-Mart, Best Buy, and Macy's are also aggressively adding more warehouse space close to major metro areas to facilitate the growth of their internet based business. This has led to an overall greater demand for logistics space close to metro areas as e-commerce participants scramble to meet rising consumer expectations for faster delivery times.

It is important to note that although the recent surge is a result of e-commerce expansion, traditional sources of demand are still very important. Space users include end retailers, wholesalers, transportation companies, and manufacturers. Industries include automotive, building supplies, medical devices, food and clothing. These traditional users have contributed to demand and are also playing a role in the new e-commerce world.

E-Commerce Food Distribution

The entire non-perishable center of the supermarket is exposed to e-commerce as much as any other sector. The perishable periphery (i.e. meat, poultry, dairy, produce) is less exposed for now but things are changing. Amazon's recent purchase of Whole Foods gives them access to densely populated high income areas and potentially Last Mile delivery centers. Amazon is already in the grocery e-commerce market with its AmazonFresh and AmazonPantry platforms. AmazonFresh is currently available in 21 U.S. metro areas, including cities in New York, California and Washington. Aldi has teamed up with Instacart to compete for the online user. Instacart already has partnerships with grocers such as Wegmans, Publix and Ahold Delhaize. FreshDirect, Wal-Mart and Safeway are offering or testing home delivery. Only about 1-3% of the roughly $1.5 Trillion U.S. grocery industry has moved online. This is significantly below the penetration rate achieved in countries with more concentrated populations such as the U.K. at 5% and South Korea at 10.3%. Nevertheless, this signifies that there is potential for increased e-commerce share. Even a 1% to 5% increase would result in significant logistics space demand.

Third Party Logistics Providers (3PL)

It takes significant scale for a retailer to manage its own e-fulfillment and many smaller retailers are turning to third parties including 3PLs to handle this for them. Others outsource the task to Amazon, which then boxes the good in an Amazon box.

According to Prologis, third party logistics providers account for about one-quarter to one-third of its customer base. 3PL's are becoming very important to smaller merchants since duplicating the infrastructure, logistics, and data of larger players is expensive. Big data accelerates delivery time and this has benefitted large players such as Amazon. In order to compete, Walmart, Costco, Kohls, and Kroger, have decided to team up with Google Express. Google contributes its data and technology advantages. Other third-party distribution companies such as Shipt, and Instacart are employed to share the costs of processing online orders.

Smaller Disruptive Trends

Although nothing is directing shifting geographic demand more than the rise of e-commerce, there are other slower trends shifting geographic focus such as 1) population redistribution, 2) slow shift from Pacific ports to Gulf and Atlantic Ports, and to significantly lesser extent 3) cannabis legalization in some states.

Population Redistribution

Consumption is the main driver of logistics real estate demand. Accordingly, the relative size and growth of markets is most closely correlated with the amount of consumption within each respective market. The shift of the US population to the south and west should increase demand in those markets. The following chart lists the top population gainers for metro areas with more than one million people.

Table 9 - Population

Metro	2012	2017	% Change
Austin	1,840,100	2,116,020	15.0%
Orlando	2,231,607	2,517,883	12.8%
Raleigh	1,191,763	1,343,453	12.7%
Houston	6,198,315	6,904,430	11.4%
Las Vegas	1,999,235	2,211,747	10.6%
San Antonio	2,242,828	2,471,143	10.2%
Phoenix	4,333,763	4,769,557	10.1%
Nashville	1,731,025	1,902,613	9.9%
Dallas - Fort Worth	6,717,093	7,379,383	9.9%
Charlotte	2,299,635	2,524,993	9.8%

Source: CoStar

The following chart lists the top population losers or slowest population gainers for metro areas with more than one million people.

Table 10- Population

Metro	2012	2017	% Change
Memphis	1,339,902	1,345,770	0.4%
Milwaukee	1,567,830	1,572,873	0.3%
Detroit	4,293,682	4,300,177	0.2%
Long Island	2,850,790	2,854,530	0.1%
Chicago	9,519,143	9,529,880	0.1%
Rochester	1,083,502	1,078,617	-0.5%
Buffalo	1,135,720	1,129,183	-0.6%
Cleveland	2,064,293	2,050,090	-0.7%
Pittsburgh	2,361,683	2,343,150	-0.8%
Hartford	1,214,987	1,204,757	-0.8%

Source: CoStar

Gradual shift from Pacific Ports to Gulf and Atlantic Ports

East coast ports have been gaining 1% per year in market share over the past five years. There is reason to believe that this shift will continue. The shift of the U.S. population to the southeast and southwest should increase demand at gulf coast ports such as Houston, New Orleans, and Tampa as well as east coast ports of Savanah and Hampton Roads. According to a report from CBRE's David Egan, the east and gulf coast ports accounted for nearly all of North America's cargo volume growth in 2015. According to CBRE, the West Coast's market share dropped to 52% of all TEU (Twenty Foot Equivalent Unit) volume in 2015, down from 54% in 2014 and 57% in 2010.

The reasons for the gradual shift from the pacific coast to the east and gulf coasts are the 1) desire to get closer to consumers, 2) west coast labor strife, and 3) ultimately the widening of the Panama Canal.

China became a member of the World Trade Organization (WTO) in December 2001. It then began exporting goods to the U.S. at an accelerated rate. Naturally, based on geography, those exports went chiefly to the large west coast ports of Los Angeles and Long Beach. Goods were then taken by train and/or truck to distribution centers in Dallas-Ft. Worth and Chicago. Two thirds of the shipping were coming from the western half of the United States whereas, 67% of consumption was happening east of the Mississippi River. Gradually, a certain share of imported goods was redirected to gulf coast and east coast ports.

Another factor influencing shipping patterns, and as a corollary logistics space demand, is that the west coast ports of Los Angeles and Long Beach have a history of labor strife. A relatively recent labor action at Los Angeles/Long Beach ports caused delays of imports in 2014 and contributed to some redirection of imports to gulf coast and east coast ports. Perhaps Wal-Mart and Home Depot opened logistics facilities in Houston to respond to the resultant disruptions in Los Angeles/Long Beach. The remote northwestern Canadian port of Prince Rupert, with no significant local population, gained market share in the effort of certain importers to avoid California ports.

The 2016 Panama Canal expansion allowed for larger ships to pass through the canal and enable ships to deliver goods from Asia to the gulf and east coast closer to consumers. The new Panamax size ships capable of carrying 12,000 standard-size shipping containers are more than double the size of the existing Panamax ships, which can carry just 5,000[14].

Table 11 - Loaded Inbound TEUs (Domestic or Foreign)

Port Name	2015
Los Angeles - CA	4,064,075
Long Beach - CA	3,635,894
New York (NY and NJ) - NY	3,247,436
Savannah - GA	1,619,417
Port of Virginia - VA	1,064,947
Tacoma - WA	926,217
Oakland - CA	846,476
Houston - TX	844,768
Charleston - SC	835,706
San Juan - PR	590,696

Source: US Army Corps of Engineers

[14] Previously, the maximum ship size that could transit the canal—classified as Panamax—was constrained by the size of the two main locks, which measured 110 feet wide, 1,050 feet long and 41.2 feet deep. The wider locks now measure 180 feet wide, 1,400 feet long and 60 feet deep, doubling the waterway's capacity and accommodating Post-Panamax ships measuring up to 1,200 feet long and carrying as many as 14,000 TEUs (twenty-foot equivalent units).

Table 12 - Loaded Inbound & Outbound TEUs (Domestic or Foreign)

Port Name	2015
Los Angeles - CA	5,526,289
Long Beach - CA	5,172,498
New York (NY and NJ) - NY	4,613,058
Savannah - GA	2,824,529
Port of Virginia - VA	2,003,703
Houston - TX	1,753,047
Oakland - CA	1,656,440
Tacoma - WA	1,646,508
Charleston - SC	1,551,578
Seattle - WA	1,072,946

Source: US Army Corps of Engineers

Many U.S. East and Gulf Coast ports are in the process of upgrading or have already upgraded their ports in anticipation of Panama Canal widening. The improvements include dredging and deepening channels and installing very large cargo cranes to accommodate the larger ships. The Port of NY & NJ could not accommodate larger ships because the Bayonne Bridge on the approach to Port of NY & NJ was too low. The Bayonne Bridge was raised in September 2017 and the port can now receive larger ships[15].

However, not all the ports are ready for the larger ships. Savannah is the second largest port on the east coast and offers direct interstate highway and rail access to Atlanta and the growing southeastern U.S. The Savannah Harbor Expansion Project will deepen the 18.5-mile outer harbor to 49 feet at mean low water and the Savannah River channel to 47 feet and dredging is expected to be completed in 2020.

The Port of Houston has experienced growth in container volume in the range of 10 percent annually for five years. In addition, it is expected to benefit from an expected increase in petrochemical exports from Gulf Coast ports as the U.S. is on the verge of becoming a consequential crude oil exporter. PortMiami, which has spent $1 billion on dredging and other improvements is ready to handle larger ships.

Florida ports are already experiencing increased volumes due to shippers and businesses wanting to diversify between the West and East Coasts and are already servicing the larger ships according to Doug Wheeler, president and CEO of the Florida Ports Council. He believes that larger volume from the New Panama Canal will lower costs and create value for shippers, and notes Florida's readiness, citing the "historical infrastructure investments in facilities and connectivity [it has] made over the past six years.[16]"

The increased capacity of the expanded Panama Canal should eventually result in larger Asian export ships shifting to east and gulf coast ports. Reported data since the Panama Canal expansion was completed in 2016 has revealed no immediate eastward migration. However, as east coast ports complete their adjustments to accommodate larger ships, shipping share allocation should continue to shift. Both the ports and the population shift should benefit southeast, gulf and Texas cities.

Cannabis Legalization

The 2012 legalization of cannabis in Colorado and Washington has had a profound impact on the industrial market in Denver and Seattle. Facilities with dimensions or locations disadvantageous to warehousing are

[15] The goal is to handle 10,000- to 12,000-TEU ships
[16] Paul Benecki," When Will the New Panama Canal Affect East Coast Ports?", The Maritime Executive, May 12, 2016

often well suited for growing and processing cannabis. Logistics rent in Denver and Seattle increased 57% and 42% respectively since 2012 compared to 31% for the U.S. This natural experiment may presage similar rent increases in other states such as California which legalized cannabis at the end of 2016. Nevertheless, marijuana remains an illegal Schedule I controlled substance under federal law. The new attorney general has pledged that he would prosecute cannabis users in states in which it is legal. It remains to be seen what the upside is in further legalization.

Types of Distribution Facilities

Large Bulk Warehouse

Online retailers such as Amazon are no longer necessarily less expensive than physical stores. In addition, Amazon now collects sales tax in all states that have one[17]. Accordingly, the competitive advantage of e-commerce is now based primarily on selection and convenience. Therefore, large inventory and speed of delivery is vital to their success. There is an increasing need to locate within and adjacent to major population centers to meet rising consumer expectations for faster delivery times. The old standard of five-day delivery is now considered unacceptable. Therefore, large facilities close to consumer markets have become very important.

There is particular demand for massive distribution facilities within 100 miles of major metro areas such as in Lehigh Valley, a major distribution hub on the periphery the New York Metropolitan area. Imported goods come in to the port of New York and get stored in Lehigh Valley and then distributed in the New York area. Warehouses near high-population cities such as Los Angeles and New York are 98-100% occupied for most large industrial REITs, while the overall occupancy rate is 96% to 97.5%. Prologis's west coast properties average 98% occupied, below peers DCT (99-100%) and Duke (100%). Typically, demand for big box logistics facilities is driven by global trade patterns and national or broad regional distribution.

Last Mile (Shallow Bay, Infill Warehouse)

The sub-property type that investors rejected has now become the cornerstone of portfolio growth. A key characteristic of logistics in 2017 is the need to be closer to urban cores and dense consumption zones. The dearth of Last Mile assets has resulted in the creative and adaptive re-use of older assets. Even smaller, older facilities close to population centers that had previously been out of favor are now in demand. Last Mile buildings have become increasingly valuable to online retailers. As an example of the growing demand for Last Mile facilities to accommodate e-commerce, Madison Realty Capital has closed on a $78 million ($127/SF) purchase of a pair of neighboring industrial buildings which total about 613,000 square feet in Jamaica, Queens. The group is seeking rental rates in the mid- to high teens per square foot. The revival of demand for heretofore semi obsolete space situated in deindustrialized northeastern locations is stark, yet supply is limited. Madison Realty calculated that about 10 million square feet of industrial space in New York City has been converted to other uses, such as offices and hotels, over the past decade[18]. Demand is growing and supply is shrinking for this type of Last Mile product. Older industrial buildings in New Jersey and Nassau/Suffolk County are being leased and driving vacancy rates to historic lows.

Last Mile suitable properties situated in major metro areas are becoming more difficult to find. Prologis plans to begin construction on its first multistory warehouse in the U.S. this year. Its plans for a three-story 580,000 square foot warehouse in an infill location in Seattle could lead the way for more multistory projects in other cities where land is expensive and there's limited room for new development[19].

The lease up of older vacant space helped drive total vacancy down. E-Commerce and logistics / distribution dominate new construction leasing. In the past traditional retailers typically processed their e-commerce sales at their brick-and-mortar locations. The feasibility of this has declined as speed is vital and speed is enhanced by specialized fulfillment setups.

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[17] By April 2017 Amazon was collecting sales tax in the 45 states that have a sales tax.

[18] Daniel Geiger, "Developer cites surging e-commerce demand in $78 million deal for Jamaica industrial buildings" Crain's New York Business, July 26, 2017

[19] https://www.prologis.com/logistics-industry-feature/rising-challenge-first-us-multistory-warehouse

General Description of Desirable Markets

Demand for logistics space which includes warehouse and distribution facilities is primarily driven by consumption – more specifically imports. Therefore, proximity to ports of entry, distribution hubs, as well as large consumption zones is of paramount importance. Within these areas large bulk mega warehouses or big box facilities on the periphery of major consumption zones and Last Mile close-in warehouses are the focus of demand.

Trade growth for the types of goods that flow through logistics real estate buildings outperforms economic growth, adding to demand in some of the largest and most supply-constrained markets in the world. Desirable areas include those with population density and that are major distribution hubs, and areas with a below average ratio of logistics space to population. Another important characteristic is that the metro have an established second tier pool of tenants, beyond e-commerce. Areas away from non-metro areas but near highways are riskier and may have lower long term sustainability.

Demand growth will also follow internal U.S. migration patterns. The U.S. population is shifting south and west and growing metro areas such as Dallas, Atlanta, Phoenix, Nashville, and Denver should experience increased demand.

The past 12 months ending Q2 2017 has witnessed steep rent increases. The most pronounced increases have been for the California markets of Inland Empire. East Bay. Stockton, Sacramento and the pacific port city of Seattle. Other profound increases occurred in the New York area and the Tennessee cities of Memphis and Nashville.

Table 13 - Year Over Year Growth Rate

Metro	2Q2017
East Bay	15.3%
Inland Empire	13.5%
Long Island	13.3%
Seattle	12.9%
Eugene	12.5%
Stockton	12.1%
Sacramento	12.0%
Memphis	11.3%
Nashville	11.3%

Source: CoStar

Big Five Markets

The big five U.S. logistics hubs[20] include 33% of the logistics space in the nation's 206 largest markets covered by CoStar. The largest is Los Angeles which includes Orange County and Inland Empire and constitutes 9.3%. New York which includes New York, Northern New Jersey, Long Island, Stamford, and Lehigh Valley comprises 6.5%. Chicago (5.8%), Dallas-Ft. Worth (5.8%) and Atlanta (5.0%) round out the top five. These top five markets generally correspond to Prologis's top five logistics clusters. The concentration is more pronounced regarding the largest logistics facilities. Since 2000, five broad clusters

[20] For the purposes of this paper, New York includes New York, Northern New Jersey, Long Island, Lehigh Valley and Stamford. Los Angeles includes Los Angeles, Orange County and Inland Empire.

in the U.S. have accounted for nearly 60% of the largest logistics real estate facilities (>500K sf) delivered to market.[21]

These consumer and trade-oriented logistics clusters thrive on physical infrastructure such as roadways and highway interchanges, ports, and rail access. These improvements are vital to the clusters achieving and maintaining supremacy and dictate the size of the logistics footprint in the area. Each of the biggest U.S. clusters benefits from global trade patterns and/or being regional distribution hub.

These big box clusters each possess an MLQ score[22] significantly greater than 1.0, placing them among the highest MLQ scorers in the world: Central and Eastern Pennsylvania (2.3), Southern California (1.6), Chicago (1.6), Dallas (1.5) and Atlanta (1.4)[23]. These trade oriented markets have access to high-quality highways, seaports, airports and rail intermodals[24].

Prime Logistics Rents

According to CBRE, U.S. industrial hubs posted the strongest growth in prime logistics rents for the past year. Prime logistics is defined as larger facilities with modern functional specifications[25]. Demand for top-quality warehouses and distribution centers continued to outpace supply globally. CBRE's second-annual Global Industrial & Logistics Prime Rents Report found that the past year's steepest gains came in the U.S., where demand is robust for distribution space amid the build out of e-commerce-fulfillment networks. Five of the 10 markets with the biggest rent gains for prime space over the past year are in the U.S., led by Seattle with a gain of 16.9%, Pennsylvania's Lehigh Valley (up 10%) and Oakland (up 9.3%), Los Angeles/Orange County (up 9.2%) and Atlanta (up 9.2%). In the U.S., prime rents have been driven by both strong demand for facilities and, in some markets, limited new supply. Seattle's supply constraints contributed to its world-leading growth in prime rents last year.

Los Angeles, Long Beach, Orange County, Inland Empire

The largest concentration of logistics space is in Los Angeles/Long Beach/Orange County/Inland Empire constituting 9.3% of the total[26]. Vacancy rates are low. Los Angeles has a Q2 2017 vacancy rate of 2.5% (down from 5.9% in 2012). Orange County 3.2% (5.9%), and Inland Empire 5.8% (7.0%). As space became more scarce, rents soared. Los Angeles experienced a gain of 49% over the past five years while Orange County rent increased by 41% and Inland Empire's rent climbed 58%, the third highest in the nation. The year over year gain was even more pronounced at 10.2%, 8% and 13.5% respectively.

Los Angeles and Long Beach host the two biggest ports in the U.S. with container traffic of more than 10 million 20-foot equivalent units (TEU) in 2015, over 2x the amount for the Port of New York and New Jersey. The rise of the Inland Empire logistics market in Southern California was driven in large part by higher quantities of imported goods from Asia for distribution across the U.S.

New York, Northern New Jersey, Long Island, Lehigh Valley, Stamford

The New York warehouse distribution market includes the New York, Northern New Jersey, Long Island, Stamford, and Lehigh Valley areas. This expansive definition of the Greater New York logistics hub constitutes 6.3% of the total. As space became more scarce rents soared in the greater New York area.

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[21] CBRE-EA, Prologis Research. The broad New Jersey/New York and Central & Eastern PA corridor is classified as one region for big box distribution.

[22] As defined by Prologis - Modern Logistics Quotient (MLQ): The MLC for a logistics cluster divided by the median MLC for all logistics clusters in the broader regional supply chain. An MLQ greater than 1.20 signifies a highly competitive trade-oriented cluster. Modern Logistics Concentration (MLC): The ratio of modern logistics stock divided by the number of households with an annual income greater than $20,000 US$ (after adjusting for inflation and purchasing power parity) in a given logistics cluster.

[23] CBRE, Cushman & Wakefield, Colliers, Oxford Economics, Prologis Research

[24] The Evolution of Logistics Real Estate Clusters", Prologis Research, August 2015

[25] CBRE Research: The key variables for prime logistics buildings include: • Facilities greater than 100,000 sq. ft./10,000 sq. m. in size, • Clear ceiling height greater than 26-36 feet), • Office-to-industrial space ratio of no more than 10%, • Loading dock ratio of 1 dock: 10,000 sq. ft./1,000 sq. m. or less, • Building must be purpose-built for logistics and distribution (manufacturing facilities not included)

[26] Based on CoStar's data covering 206 markets

New York experienced a gain of 44% over the past five years while Northern New Jersey rent increased by 32% and Long Island's rent climbed 41%. The year over year gain was even more pronounced at 8.7%, 7.3% and 13.3% respectively. Pennsylvania's Lehigh Valley benefits from strong demand due to their proximity to major population centers. A significant share of imported goods enter through the port of NY/NJ and are stored in Lehigh Valley, PA. Lehigh Valley has experienced an 18.8% rent increase over the past five years and 6.5% over the past year. Overall vacancy is 5.8% down from 6.8% one year earlier. Vacancy rates are low. New York has a Q2 2017 vacancy rate of 4.8% (down from 9.6% in 2012). Northern New Jersey 5.1% (11.1%), Long Island 3.0% (6.2%), Lehigh Valley 5.8% (6.8%), and Stamford 7.5% (11.9%

Chicago

Chicago is a transportation center due to its geographic location on Lake Michigan, its centrality within the U.S., its rail hub and its setting at the confluence of several interstate highways. Chicago is at the epicenter of the Midwestern region, serves as its regional economic capital, and boasts the third largest airport in the U.S. measured by number of travelers. Chicago has experienced rent growth of 23% over the past five years. The year of year gain was a relatively modest 2.7%. The vacancy rate declined from 12.1% in Q2 2012 to 8.9% Q2 2017. Chicago is a major distribution hub and is the third largest in the U.S.in terms of square feet of logistics space. Chicago has 434 million square feet of logistics space, a 16% increase since 2012. However, the population has been stagnant as it grew only 0.1% during the same time period[27].

Dallas/Ft. Worth

Dallas-Ft. Worth is the fourth largest market at 5.7% of inventory and is at the epicenter of a region that has experienced explosive population and employment growth. It serves as the regional economic capital of the southwest U.S. at the confluence of Interstate highways and boasts the fourth largest airport in the U.S. measured by number of travelers. Dallas-Ft. Worth has experienced rent growth of 30% over the past five years. The year over year gain was 5.4%. Dallas-Ft. Worth is a major distribution hub and is the fourth largest in the U.S. in terms of square feet of logistics space. The vacancy rate declined from 10.8% in Q2 2012 to 8% Q2 2017. Dallas-Ft. Worth has 431 million square feet of logistics space, a 20% increase since 2012. The population grew 10% during the same time period[28].

Atlanta

Atlanta has benefitted from population and employment growth in the Southeastern U.S. It serves as the regional economic capital of the southeast U.S. at the confluence of Interstate-20. Interstate-85, Interstate-75 and boasts the largest airport in the U.S. measured by number of travelers. Atlanta benefits from its proximity to Savannah, the fastest growing and second largest port on the east coast. Atlanta has experienced rent growth of 31% over the past five years. The vacancy rate declined from 14.5% in Q2 2012 to 7.8% Q2 2017. Atlanta is a major distribution hub and is the fifth largest in the U.S. in terms of square feet of logistics space. Atlanta has 369 million square feet of logistics space, an 11% increase since 2012. The population grew 8% during the same time period[29].

Other distribution hubs

Aside from the big five, smaller but vital distribution hubs such as Memphis, Columbus, Cincinnati, Indianapolis, and Phoenix are important. Memphis the home of FedEx, is a major distribution hub and experienced 11.3% year over year rent increase. Columbus witnessed an 8.6% increase, Cincinnati 6.0% Indianapolis 3.8%, and Phoenix 4.5%. Adaptive reuse of the under-used Cincinnati/Northern Kentucky International Airport has resulted in a more intense hub for e-commerce. Amazon and online furniture retailer Wayfair Inc. have opened warehouses near the airport. FedExCorp., United Parcel Service Inc. and

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[27] IBID
[28] IBID
[29] IBID

Deutsche Post AG's DHL also have operations in the area. Retailers engaged in e-commerce often favor locations proximate to those companies that handle their shipments. Accordingly, UPS, FedEx, or DHL often act as the anchor tenant for a facility or logistics park. The quest for Last Mile product resulted in Long Island's 13.3% increase and Tennessee distribution hubs Memphis and Nashville each experienced 11.3% increases.

Pacific coast hubs including East Bay, Inland Empire, experienced the greatest year over year increases at 15.3%, 13.5% and 12.9% respectively. Seattle's overall vacancy rate has declined from 7.2% in 2012 to 4.0% in 2017. The population grew 8.9% during the same time period. Seattle has experienced rent growth of 41% over the past five years. The vacancy rate declined from 14.5% in Q2 2012 to 7.8% Q2 2017. Seattle is the tenth busiest port in the nation and nearby Tacoma is the 8th busiest by TEU volume.

Conclusion

The main engine of logistics space growth and value appreciation is the rapid expansion of E-Commerce sales. There are multiple junior growth engines benefiting certain logistics markets including shifting population and import reorientation which together emphasize the distribution of goods to major population centers. Warehouse distribution facilities are exposed to the entire supply chain resulting in a high level of tenant diversity. Markets with diverse demand drivers and substantial local consumption should continue to do well. Future change catalysts may include driverless trucks and cars, the thawing of the arctic passage, and the impact of further automation.

The distribution ecosystem is evolving in the shadow of technological climate change. Transformation is built in to the DNA of trade and distribution and has been for millennia. This evolution is so integrated in to anthropological and sociological history that it seems it is part of nature itself. This recalls the observation of Roman emperor and stoic philosopher Marcus Aurelius. "Observe always that everything is the result of change and get used to thinking that there is nothing nature loves so well as to change existing forms and make new things in their likeness"[30].

Disclaimer

[30] Marcus Aurelius, "The Meditations ", Book 6, translated by George Long, Internet Classics Archive, originally written in 167 CE, http://classics.mit.edu//Antoninus/meditations.html