Morgan Stanley

INVESTMENT MANAGEMENT

The Disruptors Are Here: Structural Forces Creating New CRE Opportunities and Challenging Traditional Underwriting Guidelines

REAL ASSETS | REAL ESTATE INVESTING TEAM | INVESTMENT INSIGHT | 2017

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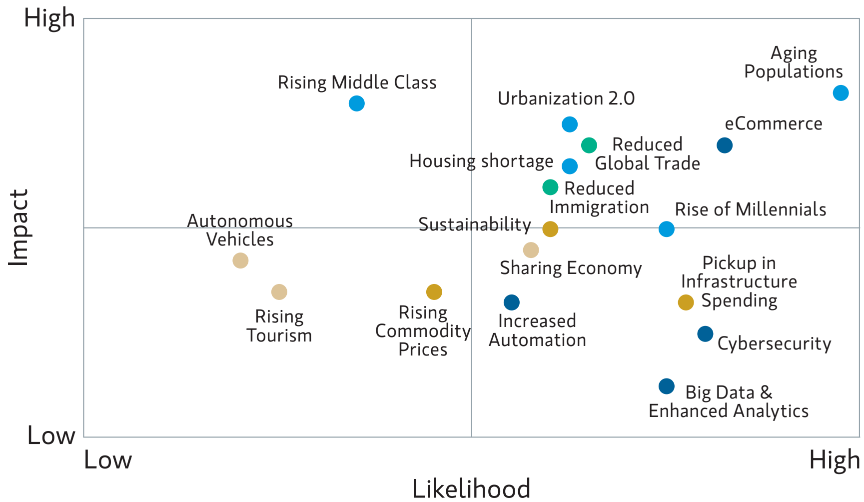
Newspaper headlines, warning that "The retail apocalypse has officially descended on America,"[1] could hardly be more alarming. The expression "retail apocalypse" returns 304,000 hits on Google, and the disruption in response to the growth of e-commerce is clearly having a significant impact on the retail real estate sector. But we also see e-commerce as an example of a larger theme—structural trends that for years were merely interesting discussion topics, perceived to be far in the future, have arrived in full force and are disrupting each and every real estate sector.

We believe investing in real estate today requires an understanding of these trends. To help clients do so, we have created a framework that looks at the possible likelihood of a trend playing out over the next 10 years versus the potential impact on commercial real estate.

In *Display 1* below, a trend in the top right, such as aging populations, is both more likely and expected to have a greater impact than one in the bottom left, say autonomous vehicles. Given that people are naturally aging, the former is guaranteed, while the technology for autonomous vehicles will likely be ready by 2021 but would require widespread adoption before it can significantly change the market. That could take 20

[1] http://www.businessinsider.com/the-retail-apocalypse-has-officially-descended-on-america-2017-3

DISPLAY 1
Trends and Disruptors



Source MSREI Strategy, as of September 2017.

DISPLAY 2
Potential Sector Impacts

	RESI	OFFICE	RETAIL	IND.	INFRA.
Demographics and aging	✓✓✓	✓✓	✓✓✓	✓✓✓	✓
Data and automation	✓	✓✓✓	✓✓	✓✓	✓✓✓
Mobility and Travel	✓✓	✓	✓✓	✓✓	✓✓✓
Natural Resources	✓	✓✓✓	✓	✓	✓✓✓
Slowdown in globalization	✓	✓	✓✓	✓✓✓	✓✓

to 30 years, lowering its rating on the likelihood axis. In terms of impact, aging populations hit all sectors of real estate—residential living, office demand, retail spending, healthcare—whereas autonomous vehicles are likely to alter office space, car parking, logistics and potentially residential preferences, but likely to a lesser degree.

We have grouped the trends into five broad categories: demographics and aging, data and automation, mobility and travel, natural resources and globalization. Here we highlight a few of these key trends, with greater detail in the first two by way of example, while discussing their implications on commercial real estate and how they can influence capital deployment strategies and underwriting guidelines.

Demographics

AN AGING WORLD

Never before in human history has the population of the planet been so heavily skewed towards the elderly. And with declining fertility and improved health and longevity, it's getting older across both emerging and developed markets. The senior age cohort (>65) is expected to increase by 54 percent in the United States over the next 15 years. Globally, the senior cohort is growing at 2.5 percent while the total population is growing at 1.2 percent, and this trend is expected to accelerate. By 2025 to 2030, this age cohort will be growing 3.5 times as quickly, at 3.2 versus 0.9 percent.[2] The proportion of older persons is projected to more than double over the next half century.

Rapid growth in older populations will be felt throughout the economy, and through all real estate sectors. Aging will weigh on workforce growth as retirees exit the labor force, lowering demand for office space. Furthermore, it will have significant impacts on spending patterns and residential needs.

Older populations spend more on healthcare services and less on consumer goods. The 65+ cohort consumes, on average, nearly $6,000 in healthcare services annually, more than twice the average health expenses of millennials.[3] Retail landlords are now considering the benefits of adding medically focused uses to their centers as an alternative to more e-commerce-sensitive tenants. In addition, we have seen rising investor demand for medical office product. For example, the year to 2Q 2017 saw investment activity of $15B in this sector, 70 percent more than in 2007, while cap rates have compressed 30 basis points to 5.5 percent over the same time period.[4]

In the United States, the 80+ cohort will increase by more than 60 percent over the next 15 years, driving demand

[2] http://www.un.org/esa/population/publications/worldageing19502050/

[3] U.S. Bureau of Labor Statistics, Consumer Expenditure Survey, as of July 2017

[4] Real Capital Analytics, Green Street Advisors

for senior living services.[5] While supply today has broadly increased ahead of current demand, putting pressure on occupancy levels, which are down 190bps from cyclical highs,[6] demand is expected to accelerate leading to improved fundamentals in the future. In addition, rising demand for medical services and products—pharmaceuticals and medical devices is creating significant demand in the medical research/life science space. Thanks to the presence of research institutions, the current demand of 2.1M square feet in Cambridge, Massachusetts, is far outstripping the available supply of lab space, which for now sits at 500,000 square feet.[7]

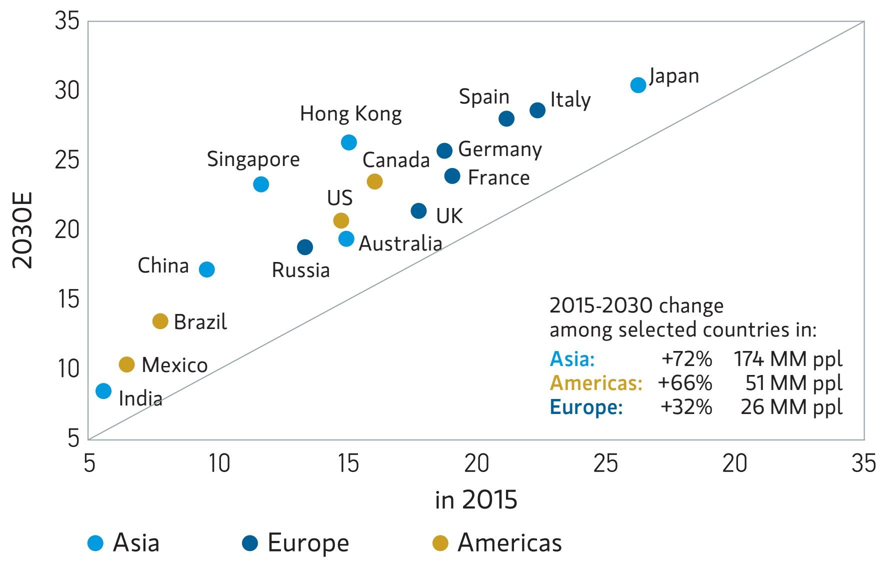
MILLENNIALS

At the other end of the age spectrum are millennials. Asia has the highest share of millennials at 32 percent versus 30 percent in the Americas and 25 percent in Europe. They have contributed to continued urbanization, particularly in markets like China and India, and have driven a surge in rental housing in the United States. Since 2008, the United States has added 6.8 million renter households while losing one million home-owning households, but millennials are now progressing into their prime spending years, including household and family formation. The extent to which millennials shift preferences towards buying versus renting and the suburbs versus downtown will have significant impacts on the multifamily and single family markets, for-sale and for-rent strategies.

Millennial housing preferences for outdoor space, walkability, transit-oriented locations and modern layouts will impact residential construction design, but they will also shape aspects of commercial real estate. Retail preferences are shifting towards experiential retail and e-commerce, but millennial employees are also changing office cultures, with preferences for urban locations driving demand for offices in central business districts and in emerging urban nodes. For example, when General Electric and Amazon announced plans to move into Boston's Seaport District, the New York Times quoted an MIT professor of urban design and planning as saying, "General Electric is not buying a place or a location, they are buying into a culture they want their employees to be a part of."[8] Another example is Aetna moving to Chelsea in New York in order

DISPLAY 3

Increasing Share of Population Age 65 or Over

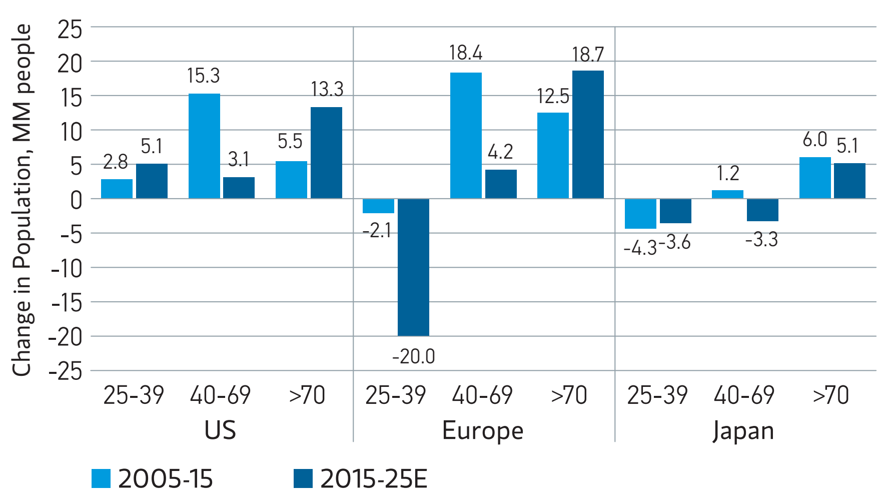


Source: UN World Urbanization Prospects, MSREI Strategy, as of September 2016.

DISPLAY 4

Millennials in the Demographic Pyramid

2005-2025E, Change in Population by Age Cohort



Source: UN Population Division, World Population Prospects, as of December 2016.

[5] U.S. Census Bureau, Moody's Analytics

[6] JLL/NIC Map Data Service

[7] Newmark, as of August 2017

[8] Professor Dennis Frenchman, Center for Real Estate, Massachusetts Institute of Technology, quoted in https://www.nytimes.com/2016/06/15/realestate/commercial/for-boston-seaport-ge-was-just-a-start.html?_r=0

to position itself as a consumer-oriented healthcare company.

These demographic and aging trends give rise to new real estate strategy and underwriting considerations:

STRATEGY CONSIDERATIONS

- Increase portfolio allocation to healthcare (medical office, life science, senior living)?
- CBD vs suburban office and residential strategies?
- Retail re-tenanting (e.g., experiential, medical uses)?

UNDERWRITING CONSIDERATIONS

- Area demographics: generational make-up, education, etc.
- Building amenities and services
- Location accessibility – walk score, transit score, car share, etc.

Data and Automation: A Change in How We Produce and Consume

Millennials have also helped drive the rapid growth in e-commerce, currently ranging from 10 to 15 percent of retail sales in most markets as seen in the chart below.[9] This shift is creating a tailwind for logistics and a headwind for brick-and-mortar retail. E-commerce share of spending varies across retail categories, capturing more than 20 percent of all United States electronics purchases in 2015 but just 1.1 percent in grocery.[10] Apparel spending, where 11 percent of purchases in the U.S. were made online, has rapidly shifted away from department stores (down 47 percent over 2006-2016) and towards e-commerce channels (up by 297 percent).[11] In the grocery sector, Amazon's acquisition of Whole Foods is expected to transform its distribution strategy and support an increase in the share of grocery spending online to 3.6 percent by 2020.[12]

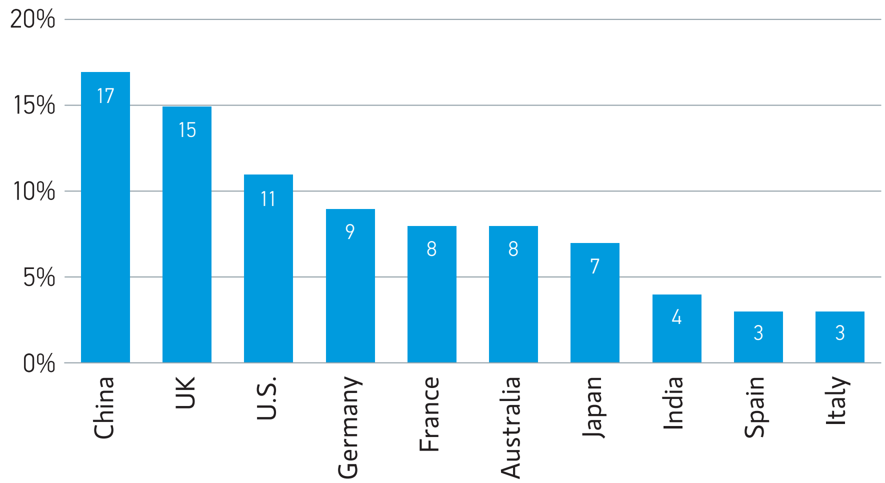
LOGISTICS AND RETAIL

Last year the largest e-commerce players took nearly 40MM SF of logistics space in the United States. This has contributed to record low vacancy rates below 6 percent and outsized rent growth of more than 6 percent per annum over the past five years.[13] Shipping costs continue to remain a big problem for retailers, averaging $4.75 for home delivery versus $0.50 for in-store pick-up, which is pushing retailers to test multiple distribution strategies, including last-mile distribution centers, urban infill centers or even discounted click-and-collect strategies. At below 4 percent, yields for high-quality well-leased Class A industrial are now so tight that development is becoming the preferred strategy for several core investors.[14] More automation, discussed below, also raises the likelihood and viability for multilevel warehouses focused on volume throughput, particularly in urban infill locations that have a higher land basis.

DISPLAY 5

Online Sales

Online Retail as a Percent of Total Retail

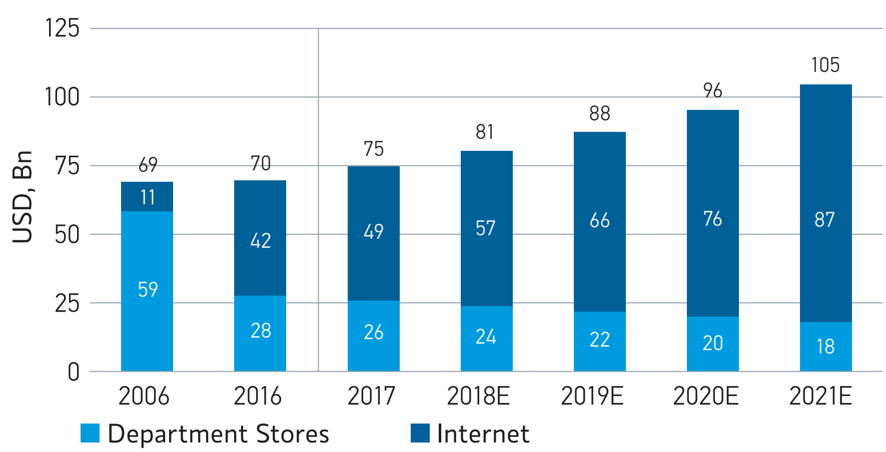


Source: Euromonitor, Quantium, ABS, Morgan Stanley Research, data as of July 2017.

DISPLAY 6

Apparel Sales

Annual Sales at Department Stores & Internet Retailers



Source: Euromonitor, Morgan Stanley Research, data as of August 2017.

[9] Morgan Stanley Research

[10] U.S. Census Bureau, Annual Retail Trade Survey, as of June 2017

[11] Euromonitor, Morgan Stanley Research, as of August 2017

[12] Morgan Stanley Research

[13] CoStar, as of July 2017

[14] NCREIF, MSREI Strategy

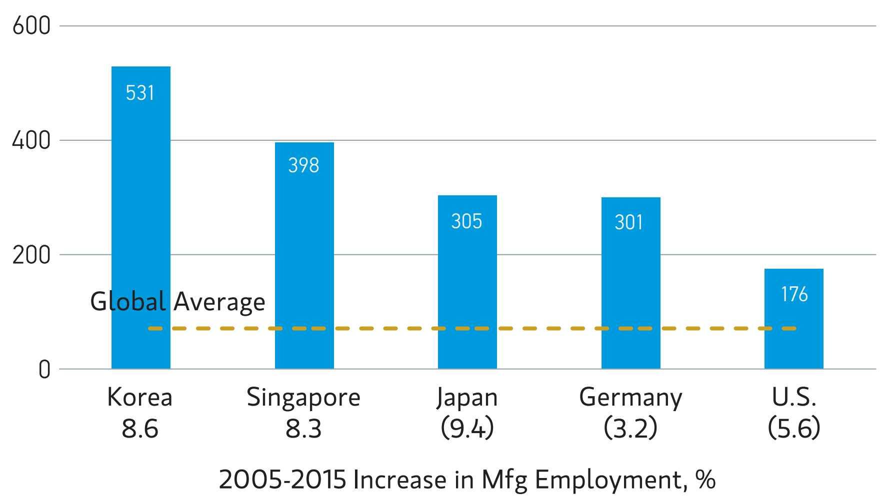
As discussed in the introduction, the outlook for the retail sector is uncertain and bifurcated, with well-located Class A malls continuing to thrive while many B/C malls are struggling on their way to becoming obsolete. With year-to-date transaction activity down 17 percent, retail is the only sector where cap rates have increased since the spike in Treasuries last November, largely driven by lower-quality properties in weaker markets.[15] Morgan Stanley Research believes that the retail sector will likely be smaller but potentially healthier in five years—the United States could afford to lose about one billion square feet of retail space (10 percent) in order to return the industry to historic sales PSF levels.[16] Meanwhile, higher-quality malls will continue to do well and benefit from the rationalization of weaker centers, reflected somewhat in REIT NOI growth forecast of 3 percent over the next four years versus the broader retail NOI growth forecast of 2 percent.[17]

DISPLAY 7

Industrial Tech Advances Manufacturing Value

Industrial Robots Installed per 10,000 Manufacturing Workers

2015



Source: International Federation of Robotics, OECD, Department of Statistics Singapore, as of December 2016.

ROBOTICS

Robots have been in the public imagination for decades, and their impact on manufacturing has been increasing in a quiet but steady and significant way. While the current worldwide average is 145 workers per robot, South Korea, the world leader in robotics use, has one industrial robot installed for every 19 manufacturing workers. These machines make work less dangerous, increase productivity, transform the physical requirements and increase the value-add in manufacturing—but they are also seen as a threat to well-paying jobs. It's no coincidence that the word *robot* comes from the Czech term for a laborer.

Over the period from 1990 to 2007, up to 670,000 manufacturing jobs in the United States were lost due to the increased use of industrial robots. Empirically over this time, each industrial robot per 1000 workers was connected to six lost manufacturing jobs.[18] On the positive side, this trend could support increased production and economic growth in countries with aging workforces, like Japan and Germany. Adidas building its Speed factories in Bavaria and Atlanta, for example, will shift sneaker production from low-cost EM countries to Germany and the United States. These new factories will use 3D printing technology and other advances to reduce production time, bringing new designs to customers more quickly, while supporting high-skilled jobs in these countries and likely requiring ancillary employment around the factory.

CONNECTIVITY

The flow of global data is now five times that of the flow of goods, services and people, providing endless opportunities for data analysis and artificial intelligence. Tenants are demanding high network connectivity, fast internet speeds and protection from cyber security threats.

These data and automation trends give rise to new real estate strategy and underwriting considerations:

STRATEGY CONSIDERATIONS

- Warehouse versus retail capital deployment?
- Traditional crossroads distribution markets versus proximity to the millennial consumer?
- Data centers?

UNDERWRITING CONSIDERATIONS

- Warehouse specs aligned to e-commerce fulfilment needs
- Internet connectivity options, redundancy, speed, cyber security
- Office usage and space per worker; building capacity and elevator loads

[15] Real Capital Analytics, as of July 2017

[16] CoStar.

[17] Morgan Stanley Research

[18] Daron Acemoglu and Pascual Restrepo, "Robots and Jobs: Evidence from US Labor Markets", MIT Economics, as of March 2017

Mobility and Travel: Opening Up Cities

Autonomous vehicles that reflect the convergence of three trends—electric vehicles, ride sharing and autonomous driving—will shake up more than just the auto industry. These vehicles could transform travel and free up an estimated 400 billion hours per year currently spent driving, increase road traffic and change patterns of traffic flow.[19] Autonomous vehicles could eventually even reshape city design, urban layout, and real estate investment if proximity to public transit becomes less valuable or travel time becomes less costly. Self-driving vehicles could also substantially increase road capacity as vehicle-to-vehicle communication allows tighter spacing between cars.

This trend could also have more immediate impacts on real estate. Parking in the U.S., for example, accounts for one hundred and fifty billion square feet, three times the total of commercial real estate space. Driverless cars could be ready in the United States by 2021—though widespread adoption is expected to take an additional 20 to 30 years—and new developments are already considering lower parking ratios, more drop-off and pick-up zones and designing parking that can be re-purposed, with considerations like flat floors, exterior ramps, and other features. Driverless cars are expected to reduce the space required for parking by as much as 62 percent, which opens up new potential space for additional amenities or even a higher and better use.[20]

Looking away from home, millennials' preference on spending a higher portion of their income on travel and leisure has contributed to a spike in global tourism, with a 28 percent increase in the number of annual travelers worldwide between 2009 and 2014 (5 percent per annum).[21] Notably, outbound travel from China has increased 106 percent from 2009 to 2013.[22] This is having a positive impact on the hotel and retail sectors.

These mobility and travel trends give rise to new real estate strategy and underwriting considerations:

STRATEGY CONSIDERATIONS

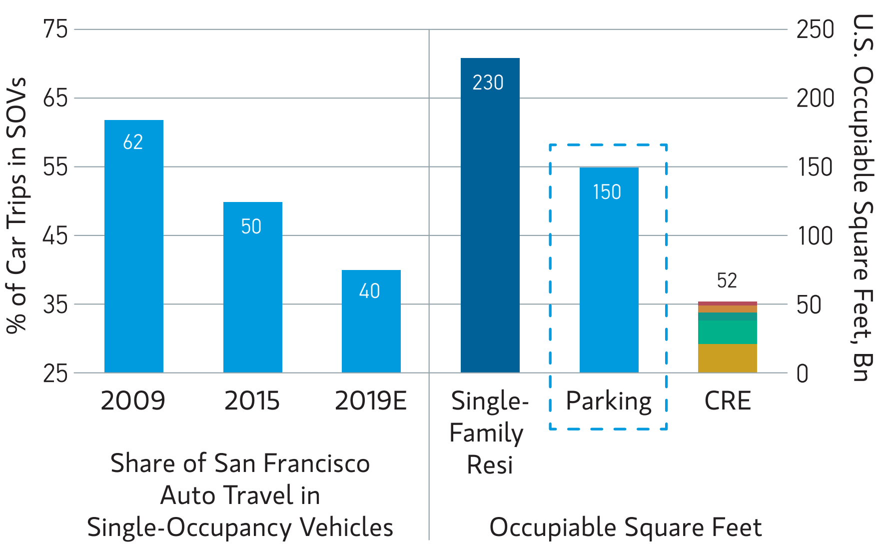
- Parking conversion or reuse?
- Increase allocation to travel and leisure (e.g., hotel, retail sector)?
- Rethink warehouse distribution networks (last mile vs driverless cars/trucks)?

UNDERWRITING CONSIDERATIONS

- Car parking ratios and garage design, revenue from car parking, pick-up/drop-off loading zones?
- AirBnB penetration rates?

DISPLAY 8

Ride-Hailing and Autonomous Vehicles Change How People Travel



Source: KPMG, Green Street Advisors, MSREI Strategy, as of November 2016.

Sustainability, Infrastructure, Natural Resources: Unlocking Opportunities

Sustainability has become a key priority for business leaders, aware that it is a prominent issue for the rising millennial generation. Sustainability initiatives can reduce costs and can make companies less vulnerable to environmental risks, negative headlines, and shifts in customer preferences. Buildings account for about a third of global carbon dioxide emissions and are expected to play a key role in helping countries and businesses reach their CO2 reduction targets. For landlords, efficiency improvements have the potential to reduce annual utilities expenses by 5 to 10 percent. Similarly, efficiency and resiliency initiatives have the potential to unlock as much as $12 billion in implied market value in the top 10 United States office markets.[23]

The rise of renewable energy along with the opening of new shipping routes will likely disrupt the patterns and volumes of bulk freight traffic for commodities like coal and oil. Volatility in electricity production and new sources of demand from electric vehicles and grid-scale storage facilities, as well as regulatory

[19] Morgan Stanley Research

[20] Road & Track, A Big Makeover is Coming to the Parking Garage of the Future Thanks to Autonomy, As of July 2016

[21] World Bank

[22] World Tourism Organization

[23] Morgan Stanley Institute for Sustainable Investing, *Bricks, Mortar and Carbon: How Sustainable Buildings Drive Real Estate Value*, April 2016

changes, will require an overhaul of grid infrastructure, including batteries and storage for renewable power sources, and new business and consumer access to charging facilities. The low cost of shale gas presents the opportunity to evolve the electricity production mix, but will require new access and transport infrastructure. Markets closely connected to particular energy sources or commodities—like Houston, Calgary and Perth for oil, or Pittsburgh for shale gas—will face tailwinds/headwinds based on those market commodity prices, efficiency of production and aggregate demand.

These sustainability, infrastructure and natural resources trends give rise to new real estate strategy and underwriting considerations:

STRATEGY CONSIDERATIONS

- Portfolio opportunities to add value with sustainability initiatives?
- Potential mispricing in commodity recovery markets (Calgary, Houston)?

UNDERWRITING CONSIDERATIONS

- LEED/Energy Star certification
- Renewable energy installation
- Market/tenant ties to energy/commodity markets

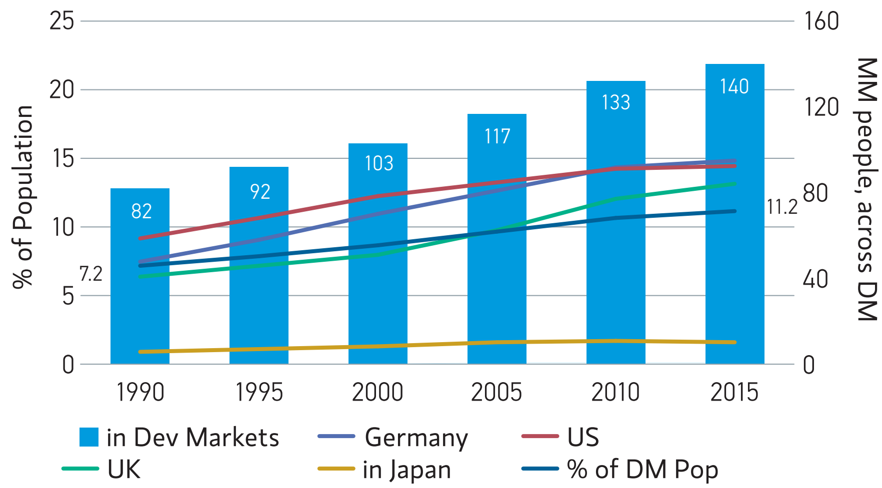
Globalization and Trade: Risks of Protectionism

Because trade patterns today are both global and deeply regional, a desire by some countries to pull back from regional integration to national-only models would likely be costly, disruptive and challenging. Countries that maintain significant trade surpluses from trading with the United States—for example, China ($347B), Japan ($69B), Germany ($65B) and Mexico ($63B)—are potentially at risk from increased tariffs.[24] So too are countries and markets that rely heavily on exports to fuel their economic growth, for example Hong Kong, Singapore, Germany, Korea, Mexico, Canada and Spain. In addition, reconfiguring supply chains and assembly would impose meaningful business costs and efficiency drags, either borne by the firm or raising prices for the consumer. Populist sentiment will also impact immigration flows which have accounted for more than half of population growth in developed markets since 1990. Reduced immigration levels would slow population growth and create potential labor-force shortages, with specific sectors that rely heavily on migrant workers, like hospitality and construction, particularly impacted.

DISPLAY 9

Immigrants Living in Developed Markets

1990-2015



Source: UN Population Division, World Population Prospects, 2015 Revision.

Recent relatively quick shifts in immigration sentiment and policy illustrate the structural headwinds or tailwinds that long-term trends can provide to occupier and investor demand. The strengthened demand for German residential property with increased arrivals in 2015, the recent focus on Vancouver as a potential newer, more open tech hub, and hesitation in Silicon Valley over a pullback in availability of skilled worker visas are illustrative examples of the impact for investors.

These de-globalization trends give rise to new real estate strategy and underwriting considerations:

STRATEGY CONSIDERATIONS

- Domestic-oriented over export-dependent markets?
- Market allocation consideration for tech/immigration heavy markets?

UNDERWRITING CONSIDERATIONS

- Location/market/sector dependency on exports?
- Extent to which immigration is a major driver of population/job growth

Conclusion: The Future Is Now

Most of the trends discussed here are inherently interesting, and have thus made their way into daily news headlines. But for many people they still appear as abstract ideas that will have an impact at some future point in time. Leading investors, however, have realized that this point has arrived and that an "apocalypse" in one sector can mean opportunities in another.

[24] U.S. Census Bureau, annual surpluses for 2016

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