Is Houston’s commercial real estate experiencing a market shift in the supply of its industrial products? The most commonly referenced measure of supply is vacancy; the square feet of unoccupied space, typically divided by total inventory and reported as a percentage. Currently, industrial real estate is seeing the lowest vacancies over the past 15 years, with an overall 4.8% vacancy but varying from as low as 1.9% for manufacturing to 5.1% for warehouse/distribution and 7.1% for flex. While vacancy captures long-term patterns in market cycles, it is less indicative of quick short-term swings in markets because vacancy does not include either direct or sublet space that is available on the market but not yet unoccupied.

Availability more accurately estimates short-term supply by including marketed space whether or not it is vacant, occupied, direct, or sublet. Availability tends to be 2-5% greater than vacancy, depending on the particular industrial product. Currently, availability is 8.3% for all industrial products combined, and 4.5% for manufacturing, 8.9% for warehouse/distribution, and 10.4% for flex. While vacancy has continued to decrease over the first three quarters of 2015, availability has actually increased, suggestive of a softening but still strong market.

Though most often associated with office markets, sublease availability is a growingly important component of market shifts in industrial real estate. Consistent with the oil downturn, the current 5.8% sublease availability (as % of total availability) is statistical greater than its 4.9% historic average. While sublease space has increased to 5.8% of total availability, this still leaves 94.2% as direct availability. It is important to note that sublease availability can increase not only under weakening market conditions, but under strengthening conditions of business expansions, though this is not likely the current case with the downturn in Houston’s oil industry.

Table 1. Sublease availability for Q3 2015 in rentable building area (RBA) and as percent of total available space (sublease RBA divided by total available RBA). The quarter-over-quarter (QoQ) and year-over-year (YoY) percent change is for percent sublease availability.

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Sublease Availability (RBA, sq. ft.)</th>
<th>Sublease as % of Total Availability</th>
<th>Percent Change in % Sublease Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q3 2015</td>
<td>Historic Mean</td>
<td></td>
</tr>
<tr>
<td>All Industrial</td>
<td>2,701,066</td>
<td>2,128,245</td>
<td>5.8</td>
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<td>Flex</td>
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<tr>
<td>Manufacturing</td>
<td>361,637</td>
<td>300,133</td>
<td>9.9</td>
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<tr>
<td>Warehouse/Distribution</td>
<td>1,864,110</td>
<td>1,393,694</td>
<td>5.2</td>
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</table>

Data InSight is a monthly business-to-community (B2C) whitepaper series that uses data analytics to look at current and historical trends in commercial real estate (CRE). Indeed, like many other industries, CRE is undergoing a revolution in the volume, velocity, and variety of data being generated. At NAI Partners, we are embracing this data revolution through data science --- the process of using the scientific method and statistics to extract knowledge from data. Complementing its full CRE platform and more than 500 years of combined broker and professional experience, NAI Partners offers a data analytics consulting service to guide its clients in their business intelligence and decision making in CRE.
Motivation

How is the pullback in Houston’s oil industry influencing the supply of various products of industrial real estate, including flex, manufacturing, and warehouse/distribution space? Indeed, central to market shifts in commercial real estate (CRE) are changes in supply. The most commonly used measure of supply in CRE is vacancy. Vacancy is the square footage of unoccupied space, often divided by total inventory to get a percent vacancy. While vacancy captures long-term (annual, multi-annual) patterns in market cycles, it is less indicative of the quick short-term (monthly, quarterly) swings in markets because vacancy does not include either direct or sublet space that is available on the market but just not yet vacant.

On the other hand, availability may better estimate short-term shifts in supply by including available space whether or not it is vacant, occupied, for sublease, or soon to come onto the market (but still occupied). Here, we examine discrepancies in the supply of industrial real estate as measured by vacancy and availability. In light of recent declines in the oil industry, we further examine whether increases in sublease availability are an indicator of a softening industrial market. We describe sublease availability as a percent of total availability, in contrast with the traditional CRE metric as percent of total rentable building area (RBA). We show how various industrial products differ in their shifts in sublease availability.

Vacancy

Vacancy measures the supply of CRE. Vacancy is unoccupied space, that is the square feet of rentable building area (RBA) that does not have a tenant physically in the space. Percent vacancy (often mistakenly referred to as a rate) is all unoccupied space divided by total inventory (multiplied by 100 to have a percentage). Vacant unoccupied space is independent of whether or not the space has a lease and whether or not the space is available for lease. Leased space that is not occupied due to being built out is still vacant space. Also, sublease space that is still occupied by a tenant is not included in vacancy, but if the tenants move out of the sublease space which still has a lease then it is included in vacancy.

Figure 1 shows percent vacancy on a quarterly basis from 2000 to 2015 for all industrial products averaged, and for each of flex, manufacturing, and warehouse/distribution spaces separately. The overall vacancy of all industrial products averaged is 4.8% for Q3 2015. However, substantial differences occur in vacancy among the three product types. As of Q3 2015, vacancy is 7.1% for flex, 1.9% for manufacturing, and 5.1% for warehouse/distribution. Indeed, over the long term, vacancy for flex space tends to be higher than warehouse/distribution which in turn tends to be higher than manufacturing which consistently has the lowest vacancy.

Vacancy of warehouse/distribution space tends to be about the same as the overall industrial average, as seen by the overlapping green triangles and black circles in Figure 1. This arises in part due to the discrepancy in inventory among the three products, with 71% of all industrial space accounted for by warehouse/distribution and only 8.9% and 14.5% accounted for by flex and manufacturing, respectively. In sum, while vacancy is a key measure of the supply of CRE, an averaged measure across products can be misleading, whereby the abundance and intermediate vacancy of warehouse and distribution products masks the higher and lower vacancy of the less abundant flex and manufacturing products.
Availability vs. Vacancy

While vacancy is the traditional metric for measuring supply of CRE, it can underestimate the actual short-term supply by not including space available for lease that is not yet vacant. Simultaneously, vacancy can overestimate actual supply by including vacant space that is already leased but not yet occupied. Availability, on the other hand, more accurately estimates supply by including space being marketed as available for lease whether or not it is vacant, occupied, or sublease. Percent availability (often mistakenly referred to as a rate) is all available space divided by total inventory of rentable space (multiplied by 100 to have a percentage).

Figure 2 plots vacancy and availability on a quarterly basis from 2000 to 2015 for each of flex, manufacturing, and warehouse/distribution space. For each of these three product types, it is evident that vacancy consistently underestimates supply by 2-5% compared with availability. Moreover, while vacancy may decline on a quarter over quarter basis, availability can increase, indicating a softening market not reflected in vacancy numbers (Figure 2). For example, vacancy for the three quarters of 2015 has steadily declined from 2.3 to 2.1%, but availability has increased from 4.0 to 4.5% of total RBA, consistent with the decline in Houston’s oil industry. This is particularly evident in vacancy versus availability of flex and manufacturing space in 2015. If we rely solely on vacancy to measure supply, then we may not only get the wrong picture of a strengthening market through ever lower percent vacancies, but we would have an inaccurate measure of actual available space, as availability tends to be 2-5% higher than vacancy.

Sublease Availability

Sublease availability is space being put back on the market that is already leased by a tenant, whereas direct availability is space offered by the building’s owner/landlord. Direct availability plus sublease availability equals total availability, each measured as square feet (sq. ft.) of RBA. Total industrial RBA of Houston is about 552 million sq. ft., with direct and sublease availability about 43.9 million and 2.7 million sq. ft., respectively (Figure 3).

With little apparent change over time, sublease availability appears invariant compared to direct availability (Figure 3). This is an artifact of scaling of the y-axis in Figure 3, which masks variation in sublease availability. Figure 4 shows sublease availability on a smaller scale of RBA for the four groupings of industrial products. This graphic shows that changes in sublease availability relative to direct availability given differences in their magnitudes (43.9 vs. 2.7 million sq. ft.)?

Traditionally in CRE, sublease availability is expressed as a percentage of total inventory RBA of a metropolitan area. For example, for all industrial products combined as of Q3 2015, Houston’s direct and sublease availability are 7.8% and 0.5%, respectively, of total RBA (552 million sq. ft.). If we are interested in the relative volume of direct vs. sublease space, then expressing direct and sublease availability as a percent of total RBA is misleading, as the denominator of total RBA can change independently and concurrently with direct and sublease availability (e.g., with deliveries). In fact, we are interested in sublease availability relative to direct availability (not total RBA), as that is what underlies the softening and shifts of industrial (and office) markets. Thus, we present an alternative way to quantify sublease availability that expresses it relative to direct and total availability, as we did for the office market (Data Insight Vol. 1, Issue 1).

We express sublease and direct availability as a percent of total availability (rather than as percent of total RBA). In this way, sublease availability is a fraction of total availability so that percent direct and percent sublease availability sum to 100. For example, total, direct, and sublease availability for all industrial products combined as of Q3 2015 are about 46.5, 43.9, and 2.7...
million sq. ft., respectively (Figure 4). Sublease availability is about 5.8% (i.e., 2,700,000/46,500,000*100). Because the denominator is total availability, rather than total RBA, direct availability is readily deduced as 94.2% (i.e., 100 - 5.8). Also, the denominator of total availability changes in accord with changes in direct and sublease space (rather than total inventory RBA). Ultimately, it is important to know the relative availability of sublease to direct space (e.g., 5.8 vs. 94.2%), as this is what can underlie shifts in markets with surges in sublease availability.

**Sublease Availability by Product Type**

Over the first three quarters of 2015, we have seen steady increases in sublease availability for all industrial products combined and for each of flex, manufacturing, and warehouse/distribution separately (Figure 5, Table 1). For all industrial products combined, sublease availability as of Q3 2015 is 5.8%, an increase of 6.1% QoQ and 20.9% YoY (Table 1, Figure 5). This 5.8% is statistically greater than the 4.9% historic mean from 2009 through 2014. For flex space, sublease availability is 7.4%, an increase of 9.5% QoQ and 40.8% YoY (Table 1, Figure 5), which is statistically greater than flex’s historic mean of 4.5% sublease availability. For warehouse/distribution space, sublease availability is 5.2%, a decrease of -1.1% QoQ but an increase of 25.6% YoY (Table 1, Figure 5), which is statistically greater than the 4.4% historic mean. For manufacturing, sublease availability is 9.9%, an increase of 22.8% QoQ but a decrease of -9.3% YoY (Table 1, Figure 5).

Despite sublease increasing over the first three quarters of 2015, this 9.9% is not different from the 9.8% historic mean from 2009 through 2014. This is due in part to the fact that sublease availability tends to be the greatest and most variable for manufacturing space, making its historic mean (and variance) larger.

Of particular note in Figure 5 is the marked difference in sublease availability between manufacturing and other products (i.e., flex, warehouse/distribution). Sublease availability for flex, warehouse/distribution, and overall industrial products as a whole remained relatively invariant, fluctuating between 3-6% of total availability. In contrast, sublease availability for manufacturing fluctuated widely, from <4% to >20% of total availability. It is important to note that sublease availability of manufacturing space is likely increasing under both weakening and strengthening markets. Most recently as of the first three quarters of 2015, sublease availability has steadily increased, likely a result of the downturn in Houston’s oil industry. On the other hand, increases in sublease availability from 2011 - 2014 were likely the result of the substantial growth in Houston’s economy, including the oil industry.

**Methodology**

Commercial real estate data on industrial space were obtained from CoStar following at the end of Q3 2015. Data were used for all industrial products combined and then for flex, manufacturing and warehouse/distribution separately. The statistical analyses and data visualization were performed using the R software and programming language:


We used 95% confidence intervals to assess differences in sublease availability between current and historic levels. For further information on the predictive analytics of vacancy and availability, please contact us.

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Chief Research and Data Scientist

Dr. J. Nathaniel Holland is a research scientist with 20 years of experience in using the scientific method to extract information from complex multi-dimensional data. He joined NAI Partners in 2014 as Chief Research and Data Scientist. At NAI Partners, Nat leverages his sharp intellectual curiosity with his skills in statistical modeling to guide data-driven business decisions in commercial real estate. Like many data scientists in the private sector, Nat joined NAI Partners following a career in academia. Prior to taking up data analytics at NAI Partners, he held professorial and research positions at Rice University, University of Houston, and the University of Arizona between the years of 2001 and 2014. Nat is the author of more than 50 scientific publications, and he has been an invited expert speaker for more than 60 presentations. Trained as a quantitative ecologist, he holds a Ph.D. from the University of Miami, a M.S. from the University of Georgia, and a B.S. from Ferrum College.