Income Migration Brings Stabilization

The Effect of High-Income Migration Patterns on Metro Volatility

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EXECUTIVE SUMMARY

- A white paper previously published by The Praedium Group and SitusAMC Insights examined the potential implications of income migration for investment opportunities and local economic and fiscal health.

- In this white paper, The Praedium Group and SitusAMC Insights show how high-income migration has had the effect of reducing the economic volatility of many of the metros seeing this inflow. This stability has implications for real estate investors and lenders, as volatility affects NOI cyclicality and cap rates.

- Local market volatility is particularly relevant to consider amid a backdrop of broader macroeconomic uncertainty. We find a link between high-income migration and an improvement in employment stability, as the inflow of high-income households helps to stabilize local economies. Meanwhile, metros experiencing outflows of high-income households are subject to greater employment volatility.

- Analysis of the top 82 US metros shows that the wave of migration, especially high-income migration, has helped to diversify local economies and decrease volatility. Sun Belt markets, especially within Florida, Arizona, and Texas, which enjoyed high-income growth during COVID-19 experienced economic volatility decreases while markets in New York and California that lost high-income households became more volatile.

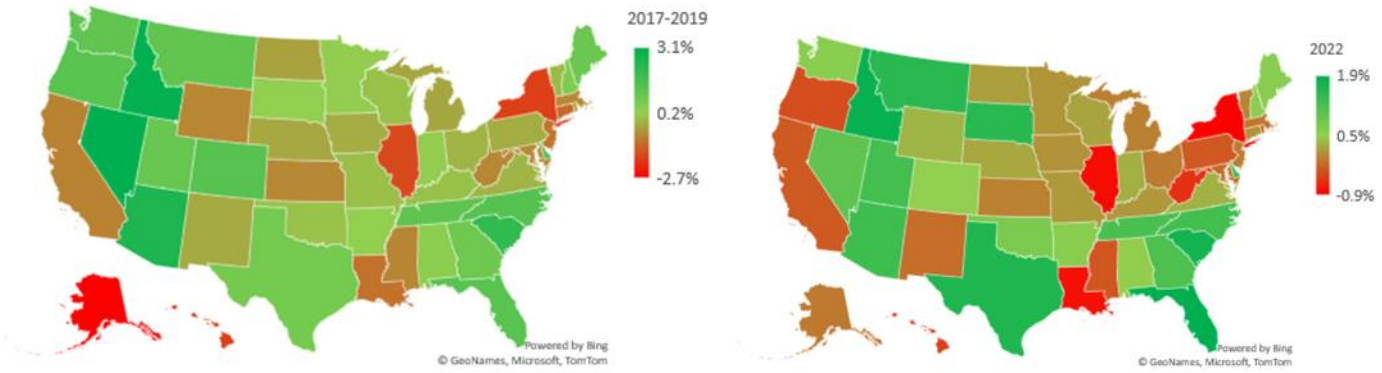
Migration Patterns and Economic Overview

COVID-19 upended global economies and transformed the way people live, work and play. As many places of business were forced to keep their doors closed, companies embraced remote work. Many employees with the means to relocate seized on this flexibility, moving from highly populated states with a high cost of living to more affordable markets, particularly in the Sun Belt.

Population growth, particularly that from domestic in-migration, has previously been identified as a driver of real estate demand, allowing investors to target markets with strong domestic in-migration and avoid non-growth areas. However, data also point to differences in the migration of wealth into these states, even though they have similar rates of population growth, providing a more textured picture of where real estate demand will grow. The benefits of an influx of wealth are likely better jobs and a diverse economy, resulting in greater demand for real estate and steadier CRE fundamentals. This paper examines COVID-19's effect on domestic migration, income migration, and local economic stability.

Population Drops in Northeast, Midwest, and CA while Gains in Sun Belt States Apparent Before and After COVID-19

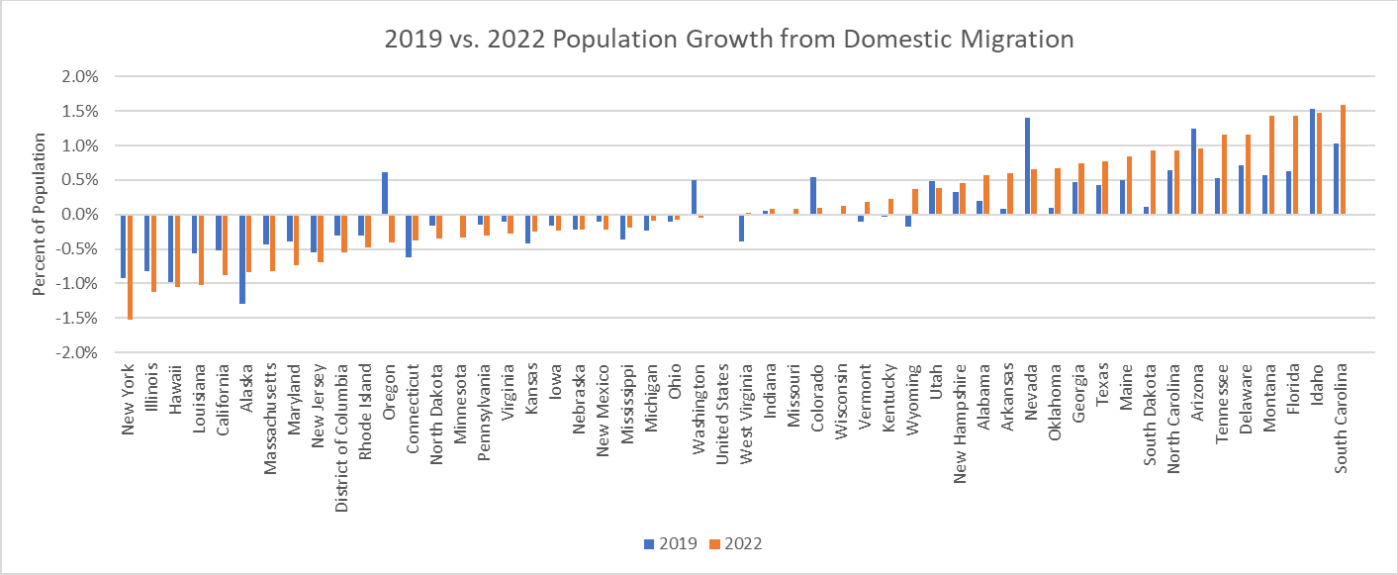
Percent Change in Population Growth, 2017-2019 vs 2022



Sources: US Census Bureau, SitusAMC Insights

Prior to the pandemic, residents were already moving out of the Northeast and California in favor of Sun Belt markets which offered greater economic growth, affordability, and better living conditions. COVID-19 and the rise of remote work further enabled this trend as workplace flexibility allowed for geographic mobility. Some of the biggest beneficiaries of population growth were states like South Carolina, Arizona, Florida, Texas and North Carolina, while other large states like New York, California, and Illinois continued to lose residents. From domestic migration we receive a general overview of how residents are flowing across the US; however, income migration reveals additional insights into the impact on local economies and real estate demand. We believe that high-income jobs offer greater financial stability across a wider range of industries than low-income jobs, allowing local economies to better withstand cyclicality as there is less reliance on a single industry. Therefore, higher income migration would tend to help diversify local economies and reduce volatility.

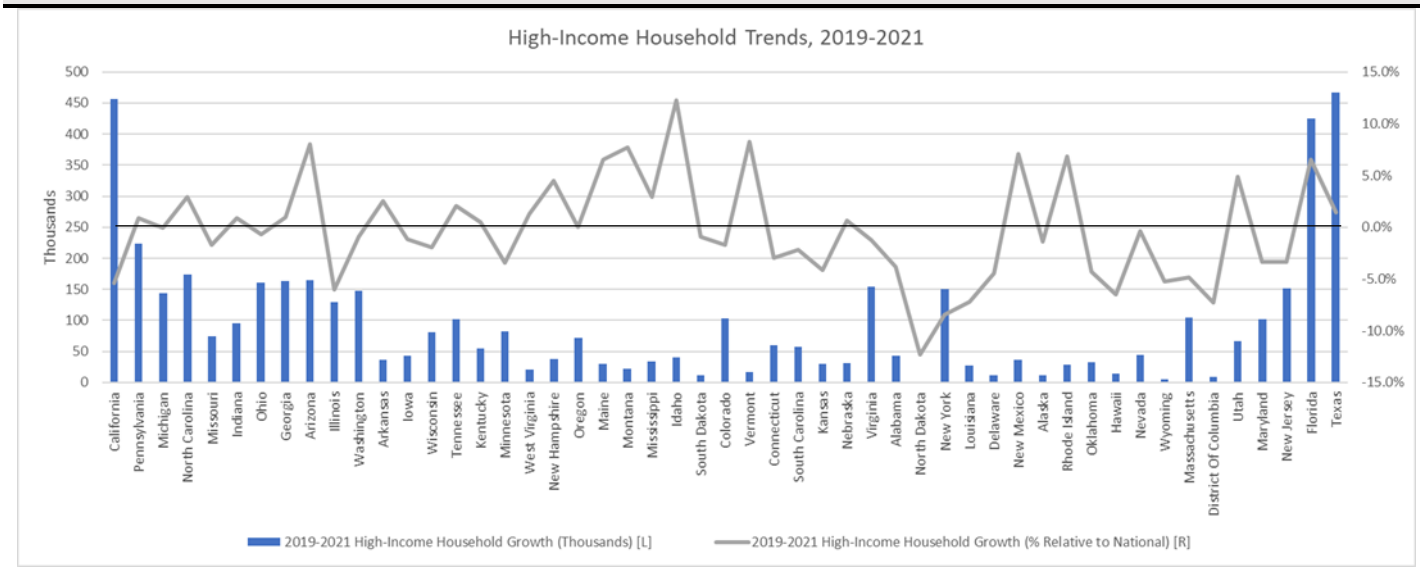
Highest Post-COVID-19 Migration from Northeast and CA, Mainly to Sun Belt Region



Sources: US Census Bureau, SitusAMC Insights

Based on US Census Bureau data, we grouped US households into income brackets tiered low (<$50k/yr), medium ($50k-$100k/yr), and high (>$100k/yr). We focused on high-income household growth (indicative of high-income migration), as we believe it has the greatest correlation with volatility changes across metros. Between 2019 and 2021, migration patterns for high-income residents related closely with overall domestic migration: Sun Belt states of Arizona, Florida, North Carolina, and Texas gained more high-income households than the national average while New York, Illinois, and California performed worse. Thus, we can look at how these migration patterns influence the economic stability of certain markets. While overall migration trends change local economic dynamics, further analysis shows that high-income residents have the greatest impact on metro employment volatilities.

High-Income Migration Correlates Well with Overall Domestic Migration



Sources: US Census Bureau, SitusAMC Insights

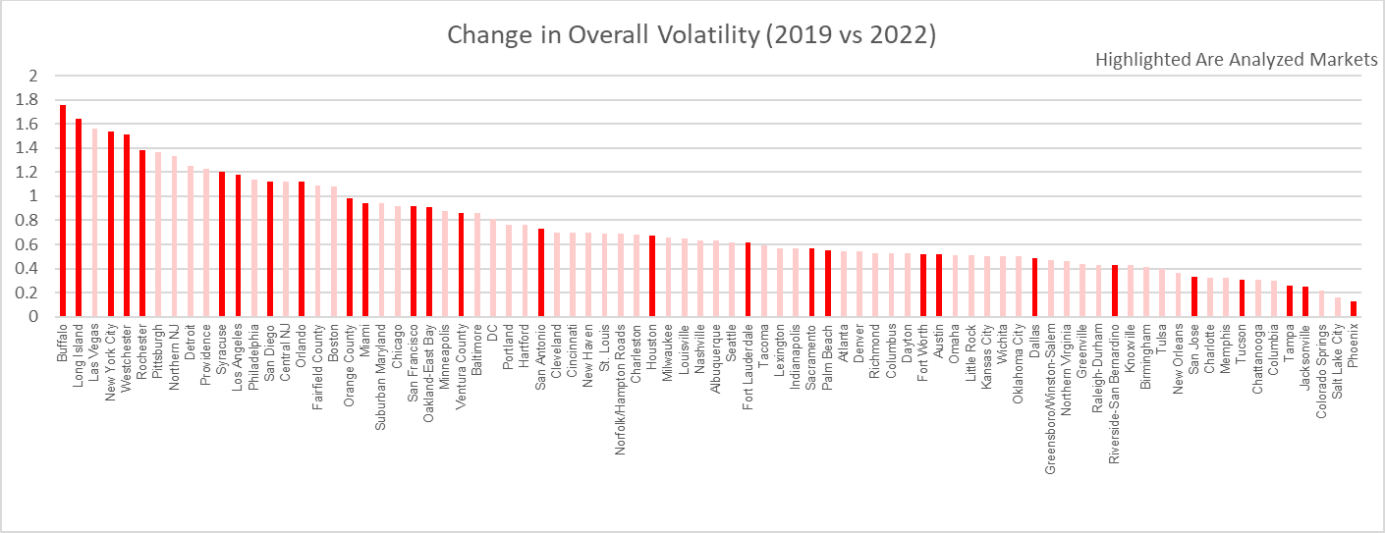
Volatility Metrics

We used different statistical measures to evaluate the shifts in volatility of metro economies from pre- to post-COVID-19 (i.e., from 2019 to 2022). For volatility, we used standard deviation to measure the overall volatility of metro employment growth, alongside beta to measure the volatility of metro employment growth relative to the national average. While it is worth noting these measures treat upside and downside volatility similarly, it makes sense to consider both when measuring volatility as higher growth can also lead to greater downside potential. Incorporating the merits of each concept helps us gain a more complete understanding of how COVID-19 and high-income migration impacted the volatility of local economies.

Standard Deviation

To measure the overall changes in economic volatility, we used the standard deviation of metro employment growth, which measures how dispersed growth is compared to its long-term average. While this does not compare against a benchmark, it is a pure measure that reflects overall volatility for each metro and accounts for a metro's own performance that may not historically move in concert with the US. For our analysis, we looked at employment growth per the Bureau of Labor Statistics (BLS) for each metro and compared the standard deviation from 1990-2019 (i.e., pre-COVID-19) to the standard deviation from 1990-2022 (i.e., post-COVID-19), a long enough time period to illustrate the shift in volatility. As expected, overall volatility increases for every measured metro due to the pandemic, however, regional discrepancies emerge in the magnitude of the changes.

Standard Deviation of Metro Employment Growth Shows Changes in Overall Volatility



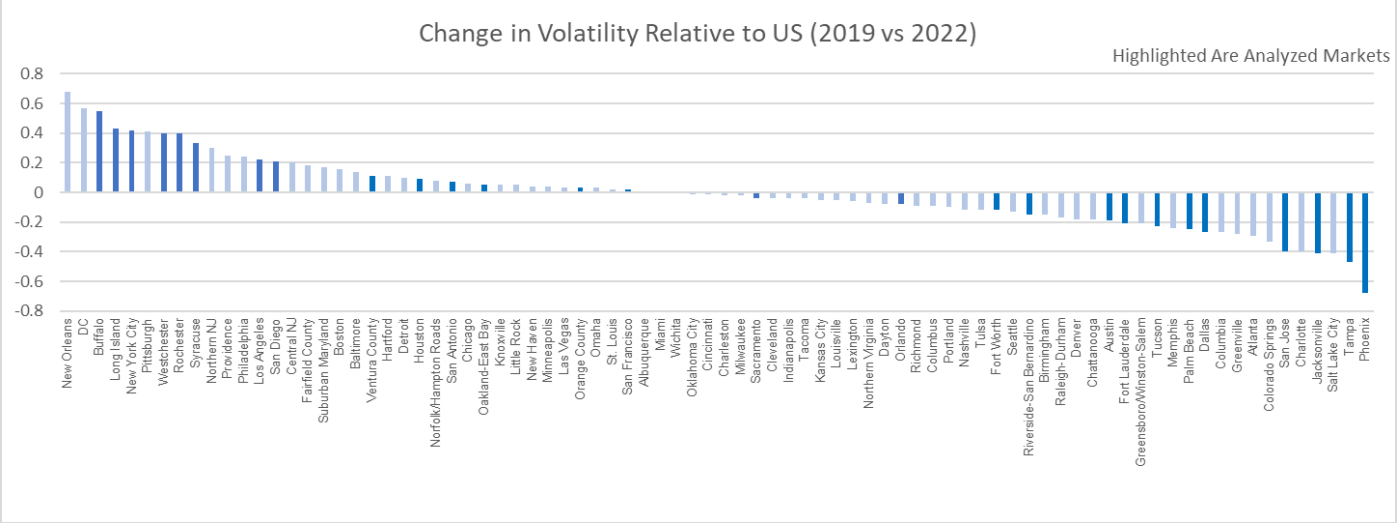
Sources: BLS, SitusAMC Insights

Although not one-to-one, a pattern similar to high-income migration emerges. Five of New York's metros were among the top six highest post-pandemic standard deviation increases, indicating a large increase in overall employment volatility. Most California metros also ranked in the higher half of the spectrum, including Los Angeles ranking highest among California markets with the 12th largest overall volatility increase. Meanwhile both Arizona metros in this analysis ranked in the bottom half of the spectrum, including Phoenix with the lowest overall volatility increase across all measured metros. Furthermore, most of Florida's and Texas' metros rank in the bottom half of overall volatility change, indicating improved employment stability relative to other top US markets.

Beta

While standard deviation looks at the volatility of a metro's employment growth compared to its average, beta looks at the volatility of a metro compared to a benchmark, in this case, US employment growth. This helps account for cyclicality and puts local volatility in the context of broader economic conditions. The results also have a fairly direct conceptual translation; a beta value of 1 means that metro employment growth trends with US employment growth, whereas a value of 1.2 implies the metro is 20% more volatile than the US.

Beta of Metro Employment Growth Shows Changes in Volatility Relative to US



Sources: BLS, SitusAMC Insights

Unlike standard deviation, which increased to varying degrees for every metro, beta was more evenly split between increases and decreases. The states of interest in this paper show a very strong correlation with high-income migration. The Northeast, especially New York, which struggled with high-income growth, saw sizable volatility increases post-pandemic. Moreover, all 6 of New York's included metros were in the top 10 highest changes in volatility relative to the US as measured by beta increases ranging from 0.33 to 0.55. New York City's beta increased from 0.96 to 1.38 as a result of the pandemic, meaning it is now 38% more volatile than the US. Although less drastic, most of California's metros saw volatility increases as well.

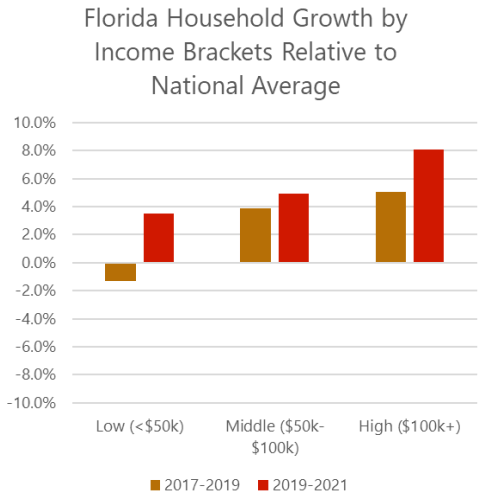
On the other end of the spectrum, Arizona, amid the influx of high-income migrants, saw Phoenix register the highest volatility decrease across all measured metros with a 0.68 reduction in its beta, while Tucson was also in the top 15. Florida metros' employment stabilized as well; Tampa and Jacksonville placed in the top 5 with beta decreases greater than 0.4, although Miami did see a minuscule volatility increase. Texas' metros were mixed, but with an average beta decrease of 0.19, the volatility decreases seen in Dallas, Austin, and Fort Worth heavily outweighed the average increase of 0.08 seen in San Antonio and Houston. Additionally, every measured metro in North and South Carolina saw volatility decreases as well. A connection between migration patterns of high-income residents and metro volatility patterns becomes apparent.

State Case Studies

We took a closer look below at metros in several states of high interest to real estate investors and lenders and that have seen the most dramatic population and high-income migrations: Florida, Arizona, Texas, New York, and California. These states are large and attract significant institutional investment capital. They also highlight the contrasting changes in domestic migration, income migration, and economic volatility.

Florida

Florida Receives Huge Influx of High-Income Migrants Post-COVID-19, Leading to Employment Volatility Reductions Across Most Metros



Key Metros	Pre-COVID-19 Beta Volatility	Post-COVID-19 Beta Volatility	Pre/Post-COVID-19 Beta Volatility Change
Tampa-St. Petersburg	1.57	1.10	-0.47
Jacksonville	1.42	1.01	-0.41
Palm Beach	1.52	1.27	-0.25
Fort Lauderdale	1.49	1.28	-0.21
Orlando	1.73	1.65	-0.08
Miami	1.23	1.24	0.01

Sources: BLS, Census Bureau, SitusAMC Insights

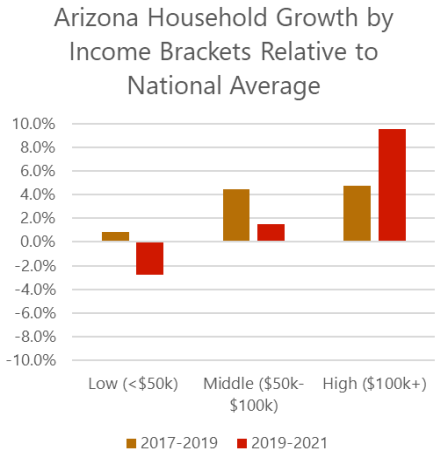
Florida was among the highest-ranked large-population states for high-income migration post-pandemic, likely contributing to its significant volatility decreases. Florida's economy has historically shown greater volatility compared to the US, as reflected in each of its metros having a pre-COVID-19 beta well above 1, driven by traditionally strong ties to the more volatile tourism and construction industries, as well as a more severe economic fallout in the aftermath of the housing bust. Nonetheless with substantial income in-migration, specifically for high-income households, most of these metros have enjoyed substantial declines in volatility post-COVID-19.

Although Tampa-St. Petersburg had been historically jumpy in response to national employment changes, the metro saw greater stability post-pandemic. This resulted in the highest volatility decrease in Florida and the second highest decrease across all measured metros (-0.47), as the metro went from 57% more volatile than the US (1.57) pre-COVID-19 to just 10% more volatile than the US (1.10) post-COVID-19. Jacksonville followed suit with a beta decrease of -0.41, as it showed even greater resistance than Tampa to employment shifts post-pandemic.

While less extensive, Palm Beach and Fort Lauderdale saw notable declines in volatility as well, recording beta decreases of 0.25 and 0.21, respectively. Orlando saw a smaller beta decline of 0.08, though it remains impressive given its incredibly strong ties to travel and tourism that took a toll during the pandemic. Miami was the sole major Florida metro that saw its beta increase, though only a marginal increase of 0.01. Miami started with a pre-COVID-19 beta well below every other Florida metro, so there was less room for improvement but still earned the third-lowest post-COVID-19 beta at 1.24. The significant increase in high-income households aligns strongly with the broader trend of declining betas across the majority of Florida markets.

Arizona

Arizona's High-Income Household Growth Accelerates Amid COVID-19 Despite a National Deceleration of 3%



Key Metros	Pre-COVID-19 Beta Volatility	Post-COVID-19 Beta Volatility	Pre/Post-COVID-19 Beta Volatility Change
Phoenix	1.88	1.20	-0.68
Tucson	1.14	0.91	-0.23

Sources: BLS, Census Bureau, SitusAMC Insights

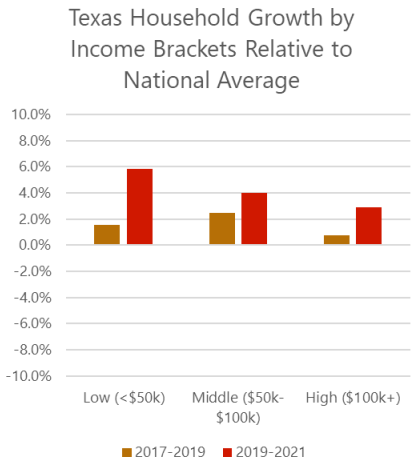
Arizona ranks 3rd highest for high-income household growth post-pandemic, notching a nearly 10% gain. In response, Phoenix saw the highest beta decrease (-0.68) across all measured metros, going from 88% more volatile than the US (1.88) pre-COVID-19 to 20% more volatile than the US (1.20) post-COVID-19. Tucson performed similarly well, ranking in the top quartile for volatility decreases with a -0.23 beta reduction.

Phoenix had a very high pre-COVID-19 beta due to its historic volatility, with housing, construction and tourism key industries contributing to that volatility, and like many Florida markets, suffered severely from the housing bust. Nevertheless, metro employment declines were less exaggerated than the national trough during COVID-19 and now trend close to the US, which caused the massive volatility decrease.

Tucson started with a much lower beta than Phoenix pre-COVID-19. Nevertheless, it saw a sizeable decline as metro employment change has been less volatile than the US during COVID-19, resulting in a post-COVID-19 beta under 1.0. The beta declines in both Arizona markets are particularly notable, as low- and middle-income household growth slowed post-COVID-19, suggesting that the acceleration of high-income household growth specifically played a substantial role in decreasing volatility.

Texas

Texas Receives Some of the Highest Low-Income Migration Post-COVID-19, High-Income Migration Decelerates Slightly but Outperforms US



Key Metros	Pre-COVID-19 Beta Volatility	Post-COVID-19 Beta Volatility	Pre/Post-COVID-19 Beta Volatility Change
Dallas	1.36	1.09	-0.27
Austin	1.30	1.11	-0.19
Fort Worth	1.07	0.95	-0.12
San Antonio	0.81	0.88	0.07
Houston	0.81	0.90	0.09

Sources: BLS, Census Bureau, SitusAMC Insights

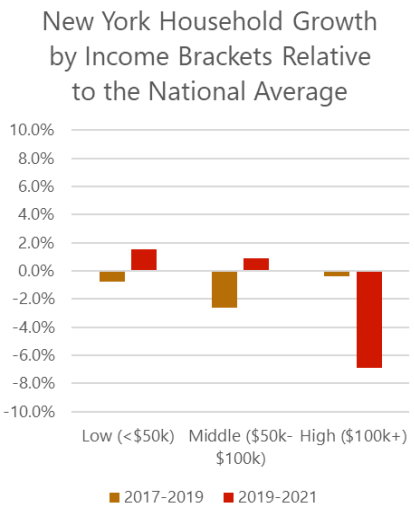
Texas saw massive population growth post-pandemic, and outperformed the national average in high-income household growth. However, the state also experienced a surge in low- and middle-income household growth, which likely contributed to the mixed volatility changes across its metros.

Dallas had both the highest pre-COVID-19 beta among the major Texas metros and the largest beta decline among the five Texas markets. Austin, in the headlines for hosting notable relocations or expansions of major companies like Oracle and Tesla, saw a similarly large beta decline. Fort Worth had a lower pre-COVID-19 beta, slightly above 1.0 but still saw a notable decline to less than a 1.0 beta.

San Antonio and Houston contrasted the trends seen in Austin, Dallas, and Fort Worth with beta increases. However, both had much lower betas prior to COVID-19 of just 0.81, and with only smaller gains, remained below 1.0 and still hold the lowest betas in Texas after COVID-19. Houston's strong oil ties allow it to deviate from broader US economic trends at times and led to an outsized impact from volatile oil prices in the immediate aftermath of COVID-19, but the metro managed to maintain a sub-1.0 beta after COVID-19. The high-income growth across Texas appears to have broadly lowered its local economic volatilities with a couple of exceptions, though those exceptions were already lower-beta metros.

New York

New York Sees Volatility Surge Amid High-Income Losses



Key Metros	Pre-COVID-19 Beta Volatility	Post-COVID-19 Beta Volatility	Pre/Post-COVID-19 Beta Volatility Change
Syracuse	0.59	0.92	0.33
Westchester	0.76	1.16	0.40
Rochester	0.55	0.95	0.40
New York City	0.96	1.38	0.42
Long Island	0.79	1.22	0.43
Buffalo	0.51	1.06	0.55

Sources: BLS, Census Bureau, SitusAMC Insights

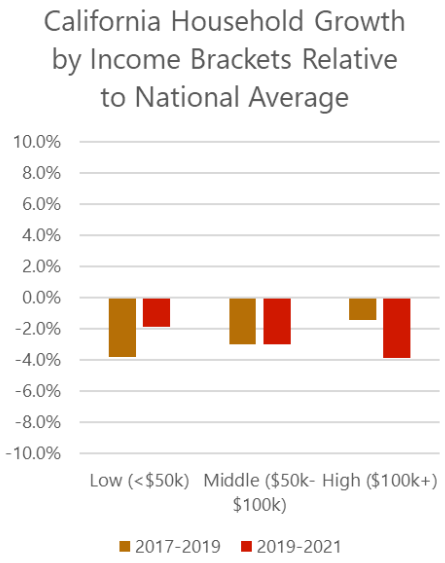
Not only did New York lose the most percentage population due to domestic outmigration, but the state also performed second worst in post-pandemic high-income household growth, despite outperforming the nation in low- and middle-income growth. After seeing high-income growth tend to spur volatility declines in the highlighted Sun Belt markets, New York averaged a 0.42 beta increase across its metros amid high-income declines.

It is worth noting the low pre-COVID-19 betas across New York, though these metros tended to have lower employment growth and all saw substantial beta increases. All six metros showed much greater resilience to the GFC than the nation but saw subpar employment growth in the 3 decades leading up to the pandemic. While these New York metros historically experienced lower employment and population growth prior to COVID-19, two measures that often go hand in hand, they also offered greater stability than many Sun Belt markets that often saw higher growth but higher volatility. However, this notably shifted when the pandemic hit, as each of these six metros saw year-over-year employment declines worse than the national average. New York City stood out with a higher pre-COVID-19 beta much closer to 1.0, however each New York metro saw a notable beta increase in the 0.33 to 0.55 range.

The volatility increases have now left most New York metros with a beta above 1.0 or at least much closer. The worsening economic volatility across New York markets again ties back to the importance of high-income household growth.

California

California Sees Volatility Largely Increase Amid High-Income Declines



Key Metros	Pre-COVID-19 Beta Volatility	Post-COVID-19 Beta Volatility	Pre/Post-COVID-19 Beta Volatility Change
San Jose	1.74	1.34	-0.40
San Bernardino/ Riverside	1.26	1.11	-0.15
Sacramento	1.06	1.02	-0.04
San Francisco	1.39	1.41	0.02
Orange County	1.33	1.36	0.03
Oakland-East Bay	1.15	1.20	0.05
Ventura County	0.96	1.07	0.11
San Diego	1.00	1.21	0.21
Los Angeles	1.02	1.24	0.22

Sources: BLS, Census Bureau, SitusAMC Insights

California was not as weak as New York in terms of high-income household growth, but still ranked 7th worst out of all states with a 4% decline relative to the US. Moreover, California underperformed in low- and middle-income household growth as well, less important to overall volatility, but still considerable. Volatility mostly increased for California with some exceptions in San Jose, San Bernardino/Riverside, and Sacramento, although volatility for the former two was already elevated.

Tech-heavy San Jose and San Francisco unsurprisingly had the highest pre-COVID-19 betas among California markets. San Jose employment growth managed to trend closer to the US pace after COVID-19 compared to greater volatility in San Francisco, resulting in a 0.40 beta decrease for San Jose and a 0.02 beta increase for San Francisco. Despite San Jose's improvement, with a 1.34 beta, it remained 34% more volatile than the US post-COVID-19, as San Jose, San Francisco, and Orange County remained the three most volatile California metros pre- and post-COVID-19.

The remaining California metros generally saw increases in volatility. San Francisco, Oakland, and Orange County saw similar beta increases in the range of 0.02 to 0.05, while Los Angeles, San Diego, and Ventura County had betas closer to 1.0 pre-COVID-19 but saw the biggest increases in volatility after COVID-19. The only other metros besides San Jose to see volatility decline were Riverside/San Bernardino and Sacramento, though both remained more volatile than the US with betas above 1.0.

Appendix

Employment Volatility

Metro	Employment Post-COVID					Employment Pre-COVID					Employment Change Pre- to Post-COVID				
	BETAS	STDERR	STD	RSQ	GMEAN	BETAS	STDERR	STD	RSQ	GMEAN	BETAS	STDERR	STD	RSQ	GMEAN
Albuquerque	0.99	1.38	2.71	0.74	1.23	0.98	1.39	2.08	0.56	1.34	0.01	-0.01	0.63	0.18	-0.11
Atlanta	1.23	0.96	3.08	0.90	1.97	1.52	0.80	2.54	0.90	2.00	-0.29	0.16	0.54	0.00	-0.03
Austin	1.11	1.47	3.02	0.76	3.68	1.30	1.43	2.50	0.68	3.67	-0.19	0.04	0.52	0.08	0.01
Baltimore	0.94	0.84	2.37	0.88	0.68	0.80	0.82	1.51	0.71	0.78	0.14	0.02	0.86	0.17	-0.10
Birmingham	0.83	0.74	2.11	0.88	0.80	0.98	0.68	1.70	0.84	0.85	-0.15	0.06	0.41	0.04	-0.05
Boston	1.23	1.17	3.15	0.86	0.79	1.07	1.18	2.07	0.68	0.86	0.16	-0.01	1.08	0.18	-0.07
Buffalo	1.06	1.36	2.86	0.78	0.00	0.51	0.75	1.10	0.55	0.12	0.55	0.61	1.76	0.23	-0.12
Charleston	1.09	1.38	2.93	0.78	2.03	1.11	1.41	2.25	0.61	2.09	-0.02	-0.03	0.68	0.17	-0.06
Charlotte	1.07	1.10	2.76	0.84	2.06	1.47	0.74	2.44	0.91	2.09	-0.40	0.36	0.32	-0.07	-0.03
Chattanooga	0.85	1.39	2.45	0.68	0.92	1.03	1.37	2.14	0.59	0.97	-0.18	0.02	0.31	0.09	-0.05
Chicago	1.08	0.44	2.60	0.97	0.54	1.02	0.43	1.68	0.94	0.61	0.06	0.01	0.92	0.03	-0.07
Cincinnati	0.88	0.74	2.22	0.89	0.79	0.89	0.57	1.52	0.86	0.92	-0.01	0.17	0.70	0.03	-0.13
Cleveland	1.00	0.57	2.45	0.95	0.11	1.04	0.58	1.75	0.89	0.18	-0.04	-0.01	0.70	0.06	-0.07
Central NJ	1.09	1.03	2.78	0.86	0.94	0.89	0.88	1.66	0.72	0.99	0.20	0.15	1.12	0.14	-0.05
Colorado Springs	0.95	1.70	2.81	0.64	2.21	1.28	1.62	2.59	0.61	2.29	-0.33	0.08	0.22	0.03	-0.08
Columbia	0.84	1.03	2.24	0.79	1.12	1.11	0.83	1.94	0.82	1.25	-0.27	0.20	0.30	-0.03	-0.13
Columbus	0.86	0.70	2.15	0.89	1.31	0.95	0.59	1.62	0.87	1.41	-0.09	0.11	0.53	0.02	-0.10
Dallas	1.09	1.17	2.85	0.83	2.37	1.36	0.95	2.36	0.84	2.28	-0.27	0.22	0.49	-0.01	0.09
Dayton	0.89	0.83	2.26	0.87	-0.11	0.97	0.81	1.73	0.78	-0.05	-0.08	0.02	0.53	0.09	-0.06
Denver	1.09	0.98	2.77	0.87	1.97	1.27	0.95	2.23	0.82	2.07	-0.18	0.03	0.54	0.05	-0.10
Detroit	1.48	1.52	3.83	0.84	0.23	1.38	1.38	2.58	0.72	0.26	0.10	0.14	1.25	0.12	-0.03
DC	0.55	1.98	2.36	0.30	0.37	-0.02	1.56	1.55	0.00	0.53	0.57	0.42	0.81	0.30	-0.16
Fairfield County	1.14	1.03	2.89	0.87	0.10	0.96	0.95	1.80	0.72	0.17	0.18	0.08	1.09	0.15	-0.07
Fort Lauderdale	1.28	1.30	3.30	0.85	1.90	1.49	1.26	2.68	0.78	2.02	-0.21	0.04	0.62	0.07	-0.12
Fort Worth	0.95	0.84	2.41	0.88	2.03	1.07	0.81	1.89	0.82	2.05	-0.12	0.03	0.52	0.06	-0.02
Greensboro/Winston-Salem	0.98	0.84	2.48	0.89	0.61	1.19	0.70	2.01	0.88	0.65	-0.21	0.14	0.47	0.01	-0.04
Greenville	1.09	1.15	2.83	0.84	1.29	1.37	0.97	2.39	0.84	1.34	-0.28	0.18	0.44	0.00	-0.05
Hartford	0.92	1.10	2.45	0.80	-0.02	0.81	1.10	1.69	0.58	0.06	0.11	0.00	0.76	0.22	-0.08
Houston	0.90	1.36	2.52	0.71	1.93	0.81	1.33	1.85	0.49	2.01	0.09	0.03	0.67	0.22	-0.08
Indianapolis	0.86	0.73	2.16	0.89	1.41	0.90	0.70	1.59	0.81	1.46	-0.04	0.03	0.57	0.08	-0.05
Jacksonville	1.01	1.18	2.66	0.80	1.97	1.42	0.85	2.41	0.88	1.95	-0.41	0.33	0.25	-0.08	0.02
Kansas City	0.76	0.72	1.94	0.86	0.90	0.81	0.67	1.44	0.79	1.02	-0.05	0.05	0.50	0.07	-0.12
Knoxville	0.65	1.16	1.92	0.64	1.41	0.60	1.16	1.49	0.40	1.36	0.05	0.00	0.43	0.24	0.05
Las Vegas	2.20	2.31	5.71	0.84	3.46	2.17	2.32	4.15	0.69	3.66	0.03	-0.01	1.56	0.15	-0.20
Lexington	0.95	1.01	2.46	0.83	1.17	1.01	1.01	1.89	0.72	1.27	-0.06	0.00	0.57	0.11	-0.10
Little Rock	0.69	0.91	1.88	0.77	1.14	0.64	0.92	1.37	0.55	1.22	0.05	-0.01	0.51	0.22	-0.08
Long Island	1.22	1.53	3.28	0.78	0.54	0.79	1.07	1.64	0.58	0.65	0.43	0.46	1.64	0.20	-0.11
Los Angeles	1.24	1.51	3.31	0.79	0.30	1.02	1.40	2.13	0.57	0.31	0.22	0.11	1.18	0.22	-0.01
Louisville	0.96	0.84	2.43	0.88	0.97	1.01	0.78	1.78	0.81	1.03	-0.05	0.06	0.65	0.07	-0.06
Memphis	0.89	0.99	2.32	0.82	0.94	1.13	0.87	2.00	0.81	0.98	-0.24	0.12	0.32	0.01	-0.04
Miami	1.24	0.98	3.10	0.90	1.25	1.23	0.93	2.16	0.82	1.27	0.01	0.05	0.94	0.08	-0.02
Milwaukee	0.90	0.66	2.23	0.91	0.33	0.92	0.58	1.57	0.86	0.48	-0.02	0.08	0.66	0.05	-0.15
Minneapolis	1.04	0.65	2.56	0.94	1.09	1.00	0.57	1.68	0.89	1.25	0.04	0.08	0.88	0.05	-0.16
Nashville	1.08	0.96	2.74	0.88	2.25	1.20	0.92	2.11	0.81	2.24	-0.12	0.04	0.63	0.07	0.01
New Haven	0.91	0.99	2.38	0.83	0.13	0.87	0.95	1.68	0.68	0.16	0.04	0.04	0.70	0.15	-0.03
New Orleans	0.85	4.89	5.27	0.15	0.23	0.17	4.93	4.91	0.00	0.40	0.68	-0.04	0.36	0.15	-0.17
New York City	1.38	1.72	3.70	0.79	0.80	0.96	1.53	2.16	0.50	0.94	0.42	0.19	1.54	0.29	-0.14
Northern NJ	1.16	1.05	2.95	0.87	0.23	0.86	0.87	1.62	0.71	0.27	0.30	0.18	1.33	0.16	-0.04
Norfolk/Hampton Roads	0.77	0.80	1.99	0.84	0.82	0.69	0.71	1.30	0.70	0.96	0.08	0.09	0.69	0.14	-0.14
Northern Virginia	0.91	1.44	2.59	0.69	1.87	0.98	1.45	2.13	0.54	2.03	-0.07	-0.01	0.46	0.15	-0.16
Oakland-East Bay	1.20	1.13	3.07	0.87	0.93	1.15	1.15	2.16	0.72	1.03	0.05	-0.02	0.91	0.15	-0.10
Oklahoma City	0.77	0.90	2.03	0.81	1.36	0.78	0.91	1.53	0.65	1.46	-0.01	-0.01	0.50	0.16	-0.10
Omaha	0.67	0.77	1.76	0.81	1.07	0.64	0.73	1.25	0.66	1.21	0.03	0.04	0.51	0.15	-0.14
Orange County	1.36	1.35	3.49	0.85	1.12	1.33	1.38	2.51	0.70	1.24	0.03	-0.03	0.98	0.15	-0.12
Orlando	1.65	1.23	4.09	0.91	2.78	1.73	1.15	2.97	0.85	2.95	-0.08	0.08	1.12	0.06	-0.17
Palm Beach	1.27	1.48	3.36	0.81	2.09	1.52	1.45	2.81	0.74	2.15	-0.25	0.03	0.55	0.07	-0.06
Philadelphia	1.03	0.81	2.56	0.90	0.58	0.79	0.67	1.42	0.78	0.62	0.24	0.14	1.14	0.12	-0.04
Phoenix	1.20	1.84	3.39	0.71	2.65	1.88	1.31	3.26	0.84	2.73	-0.68	0.53	0.13	-0.13	-0.08
Pittsburgh	0.89	1.05	2.36	0.80	0.33	0.48	0.63	0.99	0.60	0.48	0.41	0.42	1.37	0.20	-0.15
Portland	1.23	1.03	3.10	0.89	1.67	1.33	0.99	2.34	0.82	1.80	-0.10	0.04	0.76	0.07	-0.13
Providence	1.20	1.31	3.12	0.83	0.40	0.95	1.15	1.89	0.63	0.44	0.25	0.16	1.23	0.20	-0.04
Raleigh-Durham	0.91	1.04	2.39	0.81	2.25	1.08	0.97	1.96	0.76	2.24	-0.17	0.07	0.43	0.05	0.01
Richmond	0.88	0.77	2.21	0.88	1.07	0.97	0.68	1.68	0.84	1.22	-0.09	0.09	0.53	0.04	-0.15
Riverside-San Bernardino	1.11	1.96	3.27	0.64	2.69	1.26	2.03	2.84	0.49	2.72	-0.15	-0.07	0.43	0.15	-0.03
Rochester	0.95	1.07	2.49	0.82	0.17	0.55	0.69	1.11	0.62	0.30	0.40	0.38	1.38	0.20	-0.13
Sacramento	1.02	1.41	2.80	0.75	1.67	1.06	1.47	2.23	0.57	1.74	-0.04	-0.06	0.57	0.18	-0.07
Salt Lake City	0.89	1.44	2.55	0.69	2.44	1.30	1.20	2.39	0.75	2.52	-0.41	0.24	0.16	-0.06	-0.08
San Antonio	0.88	0.80	2.24	0.87	2.26	0.81	0.79	1.51	0.73	2.37	0.07	0.01	0.73	0.14	-0.11
San Diego	1.21	1.33	3.16	0.82	1.43	1.00	1.28	2.04	0.61	1.51	0.21	0.05	1.12	0.21	-0.08
San Francisco	1.41	2.41	4.12	0.66	1.07	1.39	2.34	3.20	0.47	1.18	0.02	0.07	0.92	0.19	-0.11
San Jose	1.34	2.60	4.09	0.60	1.14	1.74	2.56	3.76	0.54	1.20	-0.40	0.04	0.33	0.06	-0.06
Seattle	1.12	1.37	2.99	0.79	1.53	1.25	1.31	2.37	0.70	1.64	-0.13	0.06	0.62	0.09	-0.11
St. Louis	0.84	0.50	2.07	0.94	0.53	0.82	0.46	1.38	0.89	0.62	0.02	0.04	0.69	0.05	-0.09
Suburban Maryland	0.95	0.94	2.44	0.85	0.76	0.78	0.84	1.50	0.68	0.92	0.17	0.10	0.94	0.17	-0.16
Syracuse	0.92	0.98	2.39	0.83	-0.03	0.59	0.73	1.19	0.62	0.06	0.33	0.25	1.20	0.21	-0.09
Tacoma	0.88	1.04	2.33	0.80	1.65	0.92	0.96	1.74	0.70	1.82	-0.04	0.08	0.59	0.10	-0.17
Tampa	1.10	1.36	2.95	0.79	1.71	1.57	1.02	2.69	0.86	1.68	-0.47	0.34	0.26	-0.07	0.03
Tucson	0.91	1.54	2.66	0.67	1.46	1.14	1.51	2.35	0.59	1.60	-0.23	0.03	0.31	0.08	-0.14
Tulsa	0.85	1.37	2.44	0.68	1.04	0.97	1.35	2.04	0.57	1.18	-0.12	0.02	0.40	0.11	-0.14
Ventura County	1.07	1.25	2.83	0.81	0.92	0.96	1.26	1.97	0.60	1.04	0.11	-0.01	0.86	0.21	-0.12
Westchester	1.16	1.41	3.09	0.79	0.43	0.76	1.03	1.58	0.58	0.60	0.40	0.38	1.51	0.21	-0.17
Wichita	0.94	1.70	2.81	0.64	0.63	0.94	1.76	2.31	0.42	0.75	0.00	-0.06	0.50	0.22	-0.12

Income Volatility

	Income Post-COVID					Income Pre-COVID					Income Change Pre- to Post-COVID				
Metro	BETAS	STDERR	STD	RSQ	GMEAN	BETAS	STDERR	STD	RSQ	GMEAN	BETAS	STDERR	STD	RSQ	GMEAN
Albuquerque	0.79	2.00	2.61	0.43	5.12	0.75	2.03	2.56	0.40	4.92	0.04	-0.03	0.05	0.03	0.20
Atlanta	1.21	1.77	3.15	0.69	6.08	1.27	1.77	3.24	0.71	6.02	-0.06	0.00	-0.09	-0.02	0.06
Austin	1.38	2.71	4.01	0.56	8.13	1.44	2.61	4.03	0.59	8.07	-0.06	0.10	-0.02	-0.03	0.06
Baltimore	0.74	0.81	1.78	0.80	4.46	0.73	0.83	1.78	0.79	4.35	0.01	-0.02	0.00	0.01	0.11
Birmingham	1.02	1.10	2.45	0.81	4.73	1.03	1.12	2.49	0.80	4.62	-0.01	-0.02	-0.04	0.01	0.11
Boston	1.02	1.54	2.68	0.68	4.88	1.05	1.57	2.74	0.68	4.79	-0.03	-0.03	-0.06	0.00	0.09
Buffalo	0.50	1.44	1.78	0.37	3.56	0.45	1.19	1.52	0.41	3.36	0.05	0.25	0.26	-0.04	0.20
Charleston	1.00	2.18	3.04	0.50	5.91	1.04	2.19	3.11	0.52	5.87	-0.04	-0.01	-0.07	-0.02	0.04
Charlotte	1.64	3.57	4.99	0.50	6.35	1.70	3.65	5.13	0.51	6.25	-0.06	-0.08	-0.14	-0.01	0.10
Chattanooga	0.82	1.19	2.13	0.70	4.70	0.82	1.22	2.13	0.68	4.58	0.00	-0.03	0.00	0.02	0.12
Chicago	1.22	0.97	2.81	0.88	4.42	1.25	0.97	2.85	0.89	4.30	-0.03	0.00	-0.04	-0.01	0.12
Cincinnati	0.88	0.96	2.12	0.80	4.63	0.89	0.98	2.15	0.80	4.52	-0.01	-0.02	-0.03	0.00	0.11
Cleveland	0.98	1.03	2.35	0.82	3.55	0.97	1.05	2.34	0.81	3.39	0.01	-0.02	0.01	0.01	0.16
Central NJ	1.12	1.00	2.62	0.86	4.78	1.15	0.93	2.65	0.88	4.69	-0.03	0.07	-0.03	-0.02	0.09
Colorado Springs	0.85	1.68	2.48	0.55	5.80	0.84	1.73	2.48	0.53	5.64	0.01	-0.05	0.00	0.02	0.16
Columbia	0.84	1.05	2.09	0.75	5.07	0.84	1.08	2.09	0.74	4.95	0.00	-0.03	0.00	0.01	0.12
Columbus	0.84	1.08	2.10	0.74	5.07	0.83	1.07	2.08	0.75	4.93	0.01	0.01	0.02	-0.01	0.14
Dallas	1.52	2.05	3.86	0.73	6.32	1.60	1.92	3.93	0.77	6.28	-0.08	0.13	-0.07	-0.04	0.04
Dayton	0.69	1.07	1.82	0.66	3.53	0.64	0.95	1.66	0.68	3.32	0.05	0.12	0.16	-0.02	0.21
Denver	1.41	2.09	3.67	0.69	6.18	1.46	2.06	3.75	0.71	6.10	-0.05	0.03	-0.08	-0.02	0.08
Detroit	1.10	1.81	2.97	0.64	3.60	1.09	1.80	2.95	0.64	3.41	0.01	0.01	0.02	0.00	0.19
DC	0.65	2.02	2.43	0.33	4.67	0.68	2.06	2.50	0.34	4.62	-0.03	-0.04	-0.07	-0.01	0.05
Fairfield County	1.32	3.42	4.41	0.42	4.91	1.42	3.38	4.51	0.46	4.94	-0.10	0.04	-0.10	-0.04	-0.03
Fort Lauderdale	1.16	2.13	3.27	0.59	4.86	1.11	2.13	3.18	0.57	4.61	0.05	0.00	0.09	0.02	0.25
Fort Worth	1.31	2.20	3.56	0.63	5.98	1.36	2.18	3.62	0.65	5.91	-0.05	0.02	-0.06	-0.02	0.07
Greensboro/Winston-Salem	1.08	1.18	2.61	0.80	4.49	1.04	1.17	2.52	0.79	4.26	0.04	0.01	0.09	0.01	0.23
Greenville	1.02	1.19	2.50	0.78	5.14	1.05	1.19	2.55	0.79	5.05	-0.03	0.00	-0.05	-0.01	0.09
Hartford	0.83	1.18	2.14	0.71	3.61	0.87	1.18	2.21	0.72	3.56	-0.04	0.00	-0.07	-0.01	0.05
Houston	1.51	2.73	4.23	0.60	6.26	1.65	2.49	4.32	0.68	6.34	-0.14	0.24	-0.09	-0.08	-0.08
Indianapolis	0.87	1.37	2.31	0.66	5.31	0.84	1.39	2.26	0.63	5.13	0.03	-0.02	0.05	0.03	0.18
Jacksonville	1.17	1.37	2.86	0.78	5.63	1.15	1.41	2.84	0.76	5.44	0.02	-0.04	0.02	0.02	0.19
Kansas City	0.90	1.56	2.47	0.61	4.76	0.92	1.59	2.53	0.62	4.69	-0.02	-0.03	-0.06	-0.01	0.07
Knoxville	0.92	1.30	2.37	0.71	5.15	0.89	1.32	2.31	0.68	4.95	0.03	-0.02	0.06	0.03	0.20
Las Vegas	1.67	3.12	4.74	0.58	7.61	1.77	3.11	4.88	0.61	7.57	-0.10	0.01	-0.14	-0.03	0.04
Lexington	0.96	1.21	2.39	0.75	4.99	0.97	1.25	2.42	0.74	4.87	-0.01	-0.04	-0.03	0.01	0.12
Little Rock	0.73	1.53	2.19	0.53	4.83	0.73	1.57	2.21	0.51	4.71	0.00	-0.04	-0.02	0.02	0.12
Long Island	0.96	1.03	2.30	0.81	4.22	0.98	1.05	2.35	0.81	4.13	-0.02	-0.02	-0.05	0.00	0.09
Los Angeles	0.99	1.56	2.64	0.66	4.55	0.99	1.59	2.64	0.65	4.38	0.00	-0.03	0.00	0.01	0.17
Louisville	0.97	0.87	2.27	0.86	4.68	0.95	0.89	2.23	0.85	4.51	0.02	-0.02	0.04	0.01	0.17
Memphis	0.99	1.78	2.77	0.60	4.59	0.95	1.82	2.72	0.57	4.38	0.04	-0.04	0.05	0.03	0.21
Miami	1.25	2.80	3.85	0.49	5.28	1.26	2.70	3.79	0.51	5.18	-0.01	0.10	0.06	-0.02	0.10
Milwaukee	0.91	0.91	2.16	0.83	4.12	0.91	0.94	2.16	0.82	3.99	0.00	-0.03	0.00	0.01	0.13
Minneapolis	1.14	0.95	2.64	0.87	5.07	1.20	0.86	2.72	0.90	5.02	-0.06	0.09	-0.08	-0.03	0.05
Nashville	0.86	1.47	2.35	0.62	6.47	0.86	1.48	2.35	0.62	6.36	0.00	-0.01	0.00	0.00	0.11
New Haven	0.92	1.08	2.25	0.78	3.58	0.88	1.07	2.17	0.77	3.38	0.04	0.01	0.08	0.01	0.20
New Orleans	0.70	3.06	3.37	0.20	4.20	0.72	3.16	3.47	0.20	4.14	-0.02	-0.10	-0.10	0.00	0.06
New York City	1.01	2.15	3.04	0.52	4.48	1.05	2.20	3.12	0.52	4.40	-0.04	-0.05	-0.08	0.00	0.08
Northern NJ	1.13	1.23	2.72	0.80	4.34	1.14	1.22	2.73	0.81	4.21	-0.01	0.01	-0.01	-0.01	0.13
Norfolk/Hampton Roads	0.69	1.44	2.06	0.53	4.32	0.64	1.42	1.97	0.50	4.12	0.05	0.02	0.09	0.03	0.20
Northern Virginia	0.81	1.28	2.15	0.66	5.13	0.85	1.27	2.22	0.68	5.10	-0.04	0.01	-0.07	-0.02	0.03
Oakland-East Bay	1.38	1.97	3.55	0.70	5.75	1.33	2.00	3.48	0.68	5.46	0.05	-0.03	0.07	0.02	0.29
Oklahoma City	0.99	2.23	3.06	0.49	5.23	1.02	2.28	3.14	0.49	5.16	-0.03	-0.05	-0.08	0.00	0.07
Omaha	0.98	1.70	2.70	0.62	5.14	1.04	1.67	2.78	0.65	5.13	-0.06	0.03	-0.08	-0.03	0.01
Orange County	1.19	2.05	3.26	0.62	4.87	1.21	2.10	3.32	0.61	4.74	-0.02	-0.05	-0.06	0.01	0.13
Orlando	1.17	1.51	2.94	0.74	6.17	1.16	1.52	2.90	0.74	5.98	0.01	-0.01	0.04	0.00	0.19
Palm Beach	1.79	2.83	4.76	0.66	6.17	1.89	2.74	4.88	0.70	6.14	-0.10	0.09	-0.12	-0.04	0.03
Philadelphia	0.82	0.82	1.95	0.83	4.39	0.84	0.84	1.99	0.83	4.30	-0.02	-0.02	-0.04	0.00	0.09
Phoenix	1.41	2.19	3.73	0.67	6.39	1.43	2.22	3.78	0.67	6.21	-0.02	-0.03	-0.05	0.00	0.18
Pittsburgh	0.77	0.98	1.92	0.75	3.95	0.77	1.00	1.93	0.74	3.84	0.00	-0.02	-0.01	0.01	0.11
Portland	1.23	1.53	3.06	0.76	5.83	1.26	1.57	3.12	0.76	5.70	-0.03	-0.04	-0.06	0.00	0.13
Providence	0.80	1.28	2.14	0.66	4.23	0.74	1.14	1.95	0.67	3.98	0.06	0.14	0.19	-0.01	0.25
Raleigh-Durham	1.24	1.23	2.93	0.83	7.01	1.27	1.24	2.99	0.83	6.90	-0.03	-0.01	-0.06	0.00	0.11
Richmond	1.01	1.05	2.41	0.82	4.95	1.03	1.07	2.45	0.81	4.85	-0.02	-0.02	-0.04	0.01	0.10
Riverside-San Bernardino	0.87	2.10	2.79	0.45	5.51	0.78	2.01	2.60	0.42	5.20	0.09	0.09	0.19	0.03	0.31
Rochester	0.54	1.30	1.73	0.46	3.56	0.51	1.20	1.60	0.46	3.40	0.03	0.10	0.13	0.00	0.16
Sacramento	0.79	1.61	2.33	0.54	5.56	0.78	1.59	2.29	0.53	5.40	0.01	0.02	0.04	0.01	0.16
Salt Lake City	1.24	1.73	3.17	0.71	6.19	1.25	1.76	3.20	0.71	6.01	-0.01	-0.03	-0.03	0.00	0.18
San Antonio	0.91	1.67	2.56	0.59	5.96	0.95	1.62	2.59	0.62	5.94	-0.04	0.05	-0.03	-0.03	0.02
San Diego	0.94	1.65	2.60	0.61	5.04	0.93	1.67	2.59	0.60	4.87	0.01	-0.02	0.01	0.01	0.17
San Francisco	1.58	3.45	4.82	0.50	6.13	1.65	3.52	4.96	0.51	6.04	-0.07	-0.07	-0.14	-0.01	0.09
San Jose	1.94	4.37	6.01	0.49	6.51	2.00	4.49	6.17	0.49	6.34	-0.06	-0.12	-0.16	0.00	0.17
Seattle	1.44	2.45	3.93	0.62	6.29	1.51	2.46	4.06	0.64	6.23	-0.07	-0.01	-0.13	-0.02	0.06
St. Louis	0.86	1.09	2.14	0.75	4.13	0.86	1.13	2.17	0.74	4.02	0.00	-0.04	-0.03	0.01	0.11
Suburban Maryland	0.86	2.26	2.90	0.41	4.80	0.94	2.20	2.97	0.47	4.85	-0.08	0.06	-0.07	-0.06	-0.05
Syracuse	0.52	1.36	1.76	0.42	3.67	0.46	1.15	1.51	0.44	3.45	0.06	0.21	0.25	-0.02	0.22
Tacoma	1.01	1.58	2.67	0.66	5.72	0.97	1.59	2.61	0.64	5.50	0.04	-0.01	0.06	0.02	0.22
Tampa	0.98	1.67	2.68	0.62	5.18	0.93	1.68	2.60	0.59	4.96	0.05	-0.01	0.08	0.03	0.22
Tucson	1.03	2.05	3.00	0.55	5.34	1.02	2.02	2.96	0.55	5.15	0.01	0.03	0.04	0.00	0.19
Tulsa	1.68	5.47	6.49	0.31	5.18	1.83	5.47	6.67	0.35	5.26	-0.15	0.00	-0.18	-0.04	-0.08
Ventura County	0.84	1.42	2.28	0.63	4.77	0.83	1.45	2.29	0.61	4.63	0.01	-0.03	-0.01	0.02	0.14
Westchester	1.45	2.04	3.72	0.71	4.67	1.53	1.97	3.83	0.74	4.63	-0.08	0.07	-0.11	-0.03	0.04
Wichita	1.15	3.11	3.94	0.40	4.43	1.23	3.15	4.07	0.42	4.42	-0.08	-0.04	-0.13	-0.02	0.01

Other Metrics Explained

Within the analysis, we also calculated a group mean, R-squared, and standard error, though the results were less conclusive.

The mean growth is simply the average YoY employment/income change within the analyzed years.

R-squared explains how well fit the model is, i.e., a value over 0.5 means that national employment/income changes can effectively predict changes at the metro level. The only metros that were extremely low were New Orleans, because of Hurricane Katrina, and the District of Columbia, whose economy is very heavily dependent on government employment.

Standard error is a measure of the distance between each data point and the line of best fit, which gives a way to measure local volatility unexplained by national changes. Results were less conclusive, but again, local volatilities expectedly increased for most measured metros.

Income Volatility

Income Volatility Changes Less Apparent

Income Volatility Metric Changes

	Beta (Volatility vs US)	Standard Error (Local Volatility not relative to US)	Standard Deviation (Overall Volatility)
Average Change	-0.02	0.01	-0.01
Max Change	0.09	0.25	0.26
Min Change	-0.15	-0.12	-0.18

Sources: BEA, SitusAMC Insights

Income volatility changes were much less apparent and significant. For example, employment volatility beta change ranged from 0.68 to -0.68, while income volatility beta only ranged from 0.09 to -0.15 meaning there is much less we can glean from the results. Standard error and standard deviation for income volatility had similar dampened ratios compared with employment. Nevertheless, a few results show similarities to our employment analysis. Texas' metros saw solid income volatility decreases with Houston ranking as the 2nd highest of all measured metros. Florida's Palm Beach ranked 5th highest decrease, although most of its other metros saw some slight volatility increases. California and New York saw mixed results across its metros; however, Riverside-San Bernadino saw the highest increase while Buffalo and Syracuse ranked in the top 5 highest income volatility increase. Although less prominent, similar correlations can be pulled from the results.

Notes