

# Are Immigrant-Heavy Metro Areas More Economically Resilient?

## Lessons from the Great Recession

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### Executive Summary

Are metropolitan areas with larger immigrant populations more sensitive to economic downturns? And, if so, how quickly are these immigrant-heavy regions able to recover? While it is too soon to draw conclusions from the Covid-19 pandemic, the Great Recession of 2008 offers important lessons on how well local economies recover. As past research suggests, immigrant workers often have complementary labor force characteristics — meaning they possess different skills and work in different industries than U.S.-born workers — yet they are also often disproportionately affected by economic downturns. Given that immigrants make up significant shares of the workforce in key industries, such as technology, construction, accommodation, food services, and agriculture, the ability of immigrants — and, by extension, immigrant-dense local economies — to bounce back will have significant impact on the overall recovery of the U.S. economy. As such, examining how immigrant-dense metro areas fared during and after the Great Recession compared to less-immigrant-dense communities could help policymakers better anticipate and recover from a Covid-19 recession.

To this end, we first analyze data from the American Community Survey to assess how employment rates fluctuated during and after the Great Recession in the 100 largest metro areas in the United States. After factoring for differences in industry and the workforce in each, we then determine whether and how immigrant density contributes to the economic resilience of metro areas. Lastly, we divide our analysis into two periods: the recession (2008-2012), to determine how sensitive metro areas with different immigrant densities were to economic shocks; and the recovery (2012-2015), to determine how quickly employment rates rebounded in metro areas with different immigrant densities.

Our results from the recessionary period suggest that the greater the immigrant share of the population, the greater the negative impact on the overall employment rate. However, the metro areas with the highest immigrant shares did not suffer highest declines in employment. Instead, the relationship between immigrant share of the population and job losses resembles a U-shaped curve rather than a straight line. This suggests that other factors such as the skill and education level of the workforce, the composition of industry, and the policies of local governments may dampen the negative impacts of economic shocks. The notion that local policies can play a role in strengthening local economies during recessions dovetails with the findings from NAE's Cities Index, which show that metro areas with the most immigrants, such as New York, San Francisco, and Los Angeles, often also have some of the most immigrant-inclusive economic policies that may provide support during economically challenging times.

Our results from the recovery period suggest that the greater the foreign-born share of a metro area's population, the greater the post-recessionary rise in overall employment for all residents. This was despite signs that the U.S. labor market had still not fully recovered by 2015, the end of our period of study. These findings echo past research that found that immigrant workers have been able to recover more quickly and from a lower nadir than their U.S.-born counterparts following a pandemic-related recession.

Ultimately, more research is needed to disentangle how labor market conditions and inclusive local policies can help cities better handle recessions. However, for now our analysis suggests that the more immigrant-dense a metro is, the faster it can recover. This is important, given that many immigrant-heavy metro areas are among the most productive economic regions in the country and, as such, are critical for the overall recovery of the U.S. economy.

## Key Findings

- **Metro with the fewest immigrants saw the fewest job losses. Surprisingly, however, metro areas with the most immigrants did not see the most job losses.** Instead, those metro areas in the middle, with average sized immigrant populations saw larger job losses.
- **Metro areas with more immigrants were able to recover faster than those with fewer immigrants.** On average, each additional 1 percentage point in the foreign-born share of the population in a metro area was associated with almost 800 more employed workers in 2015, three years after the worst of the recession.
- **Together, this means that immigrant-dense areas were able to recover more quickly than areas with fewer immigrants,** even if in many cases they experienced larger employment losses during the recession.
- **These findings support the notion that immigrant-inclusive policy initiatives, often seen in immigrant hubs and traditional immigrant gateways, may soften the economic blow from recessions and help immigrants recover more quickly.** These policies, by extension, can be expected to boost the resiliency of local economies where they are adopted.

## Introduction

Despite early research on the economic impacts of the coronavirus pandemic,<sup>7</sup> the country's ongoing recovery means that it is still too early to fully assess the impact of Covid-19. For those whose work is focused on immigrant communities in the United States, this is a frustrating situation. Economic data have made it clear that immigrant workers have been disproportionately negatively affected<sup>8</sup>. At the same time, and making matters worse, these workers have largely been left out of federal financial relief programs. This has enormous economic ramifications for the U.S. economy. Immigrant households are not only significant earners — they made more than \$1.7 trillion in 2019 alone — but also substantial taxpayers and consumers who drive state and local economies.<sup>9</sup> As such, the ability for immigrants and, by extension, immigrant-dense local economies, to bounce back from the recession will have significant bearing on the overall recovery of the U.S. economy.

Without enough data from this current crisis, we turn to the most recent recession in U.S. history, the Great Recession of 2008. There are several important points of similarity between the Great Recession and the pandemic recession that make this comparison compelling. Like the Great Recession, the Covid-19 recession saw a deep initial economic contraction that had a more severe impact on certain industries: the financial services and construction industries during the Great Recession, and the leisure and hospitality sectors during the pandemic.<sup>10</sup> Similarly, both recessions hit certain demographic groups particularly hard — namely Hispanic, Black, and younger workers.<sup>11</sup> Furthermore, recent economic data has already shown that losses during the pandemic have been far more unevenly distributed than in past recessions.<sup>12</sup> Pandemic-related job losses were felt disproportionately by women, as well as by workers in service occupations and customer-facing, or “non-essential,” industries such as leisure and hospitality. Broadly speaking, workers who could work remotely during the pandemic suffered far less than those who could not.<sup>13</sup>

Research has also already shown that given these general patterns, metro areas were impacted by, and recovered from, the Great Recession differently.<sup>14</sup> This variation in decline and recovery among metro areas is likely due to a range of factors that include an area's economy, business environment, economic policies, and workforce composition — including how significant a share of the labor force immigrants make up.<sup>15</sup> Among the largest 100 metro areas in the United States, which form the universe for this analysis, there is a wide range in terms of the relative size of each metro's immigrant population. In Miami, the most immigrant-dense metro area, immigrants make up 37 percent of the population; in Youngstown, Ohio, the least immigrant-dense metro area, only 2 percent of the population is foreign-born.

Research suggests that immigrants may recover more quickly from recessions because they tend to work in industries that recover more quickly.<sup>16</sup> This means immigrants may also exhibit greater losses during a recession, because the jobs they tend to hold are in industries that are more sensitive to business cycles and economic shocks<sup>17</sup>. Kochhar (2009)<sup>18</sup> compared the change of employment rates from Q4 2007 to Q4 2008 and demonstrated severe impacts among Hispanic Americans, both U.S.-born and immigrant, compared to all other people early in the recession. In contrast, Sisk and Donato (2018)<sup>19</sup> compared employment transitions during the Great Recession for five groups of men with less than a high school degree<sup>20</sup> and found that Mexican immigrants were the most likely to remain continuously employed. At the same time, they found that Mexican immigrants were much more likely than U.S.-born whites and Blacks to shift from full-time or voluntary part-time employment into involuntary part-time work during the recession.<sup>21</sup> Meanwhile, Kochhar et al., (2010) found that immigrant workers were more likely to gain jobs sooner than U.S.-born workers at the end of the recession.<sup>22</sup>

Despite these observations, further research is needed to determine to what extent immigrants impact how significantly a metro area is affected by economic downturns and how rapidly that metro area is able to recover. Did metro areas with more immigrants show greater resilience and recover sooner or more robustly from the Great Recession compared to less immigrant-dense metro areas? It is a question that has bearing for the current crisis: How immigrant-dense metro areas fared compared to less immigrant-dense metro areas during and after the Great Recession can provide a look at what the post-pandemic economic recovery will look like in cities across the United States.

From past literature, we would expect that foreign-born-dense metro areas would exhibit greater employment loss but recover more quickly than their less immigrant-dense counterparts.<sup>23</sup> Similarly, areas with strong economic growth potential (i.e. above-average productivity, employment growth, a high innovation rate) would likely be more economically resilient and quicker to recover than areas that lack these characteristics.<sup>24</sup>

Following this concept, we analyze the employment rates of the most populous 100 metro areas in the United States for the years 2005, 2008, 2012, and 2015. Because of immigrants' uneven geographical distribution and the non-linear relationship between employment rate change and immigrant-density, we investigate how metro areas' employment rates — measured as the share of employed people in the working age population — changed over time as well as the deviation of the employment rate from the overall mean over time. In our descriptive analysis we group metro areas by immigrant-density quartiles, in order to make trends easier to visualize and understand. In our multivariate analyses we estimate the change in employment rate during the recession (2008-2012) and during the recovery (2012-2015). More specifically, we use two regression models, one for recessionary resilience and one for recovery speed, to estimate the change of employment rate during the two periods. More information can be found in the data and methodology section as well as in the appendix.

1. Peri, 2007; Kochhar et al. 2021.

2. New American Economy, 2013, 2018, 2020; Kochhar et al. 2021.

3. Ruggles et al., 2021.

4. NAE Cities Index systematically tracks and evaluates immigrant integration since 2016 by measuring local policies and socioeconomic outcomes across the 100 largest cities in the United States. <https://www.newamericaneconomy.org/cities-index/interactive-index/>

5. U.S. Bureau of Labor Statistics, 2021; Sisk et al., 2018; Bivens, 2016.

6. Kochhar et al. 2021

7. Shibata, 2020. For recent papers on the labor market impact of the pandemic recession see the references of Shibata (2020) who cites Cajner et al. 2020; Bartik et al. 2020; Kurmann et al. 2020; Dingel and Neimann. 2020; Montenegro et al. 2020;

8. Kochhar et al., 2021.

9. New American Economy, Map the Impact, 2021.

10. Shibata, 2020.

11. Shibata, 2020.

12. Shibata, 2020.

13. Shibata, 2020, page 13: Teleworkable jobs are defined by the method of Dingel and Neiman (2020) and Mongey et al. (2020).

14. Arias et al., 2016 ; Thiede et al., 2016.

15. Arias et al., 2016 ; Thiede et al., 2016 ; Fingleton et al., 2012.

16. Kochhar, 2009; Kochhar et al., 2010.

17. Kochhar, 2009; Kochhar et al., 2010.

18. Kochhar, 2009.

19. Sisk et al., 2018.

20. Sisk et al., 2018: Table 4. The five groups were: Foreign-born Mexicans, other foreign-born, US-born whites, US-born blacks, and US-born Latinos.

21. Sisk et al., 2018: Table 6.

22. Kochhar et al., 2010.

23. Kochhar, 2009; Kochhar et al., 2010.

24. Fingleton et al., 2012.

## Analysis and Results

Our descriptive analysis in Table 1 confirms past research and suggests that the greater the share of the foreign-born population, the greater the employment losses at the start of the recession.<sup>25</sup> However, metro areas with the highest share of foreign-born population (those in the fourth quartile) show more resiliency (i.e., slightly smaller employment loss from 2008-2012) during the recession than areas with low and medium foreign-born densities (those in the second and third quartiles). Table 1 also suggests that the most immigrant-dense metro areas had a quicker initial employment rate increase from 2012 to 2015 compared to the less immigrant-dense metro areas, signaling a stronger recovery potential.

**TABLE 1**

### Employment Rate and Change in Employment Rate, Metro Areas in Quartiles by Share of Population, Foreign-Born

Metros by Share of Population Foreign-Born, Quartiles	Column A - Employment rate, 2005	Column B - Employment rate, 2008	Column C - Employment rate, 2012	Column D - Employment rate, 2015	Column E - Change employment rate, 2005-2008	Column F - Change employment rate, 2008-2012	Column G - Change employment rate, 2012-2015
Smallest Share, Foreign-Born	0.701	0.708	0.673	0.689	0.007	-0.035	0.016
2nd	0.727	0.734	0.691	0.715	0.007	-0.043	0.024
3rd	0.718	0.722	0.677	0.698	0.004	-0.045	0.022
Highest Share, Foreign-Born (4th)	0.683	0.698	0.656	0.680	0.015	-0.042	0.025
Difference, 4th-1st					0.008	-0.007	0.008
Average of 100 Metros	0.705	0.718	0.678	0.702	0.012	-0.040	0.024

To investigate further, in our recessionary model we control for human capital and industry composition in each metro area to estimate the relationship between the foreign-born share of the population and the change in employment rate during the recession. The results again show that a higher foreign-born density is associated with a U-shaped pattern of employment rate change from 2008 to 2012. The higher the foreign-born density, the greater the decrease in the employment rate (Figure 1). However, once a metro area reaches a certain threshold of immigrants — 20 percent of the working age population — the drop in the employment rate becomes less and less severe as the share of immigrants increases.

To illustrate the results of the recessionary model, consider three hypothetical metro areas, each with a workforce of 2 million and the same employment rates, but with different foreign-born shares of the population: set at 5 percent, 20 percent, and 35 percent. The metro area with a foreign-born share of 20 percent would, all else being equal, have 16,000 fewer workers in 2012 than the metro area with only a 5 percent foreign-born share. However, the metro area with the highest foreign-born share, at 35 percent, would have 3,500 more workers than the metro area with 5 percent of its working age population foreign-born.

25. Kochhar, 2009.

We fit the same model to metro area quartiles based on foreign-born shares of the population. Figure 2 shows that while the first quartile — representing metro areas with the smallest shares of immigrants — handled the recession better than the others, the fourth quartile — representing metro areas with the largest share of immigrants — handled the recession somewhat better than the second and third quartiles, which had smaller shares of immigrants. This is consistent with the other recessionary model results we just discussed.

This suggests that the negative effects associated with higher foreign-born shares of the population and correlated metro level characteristics are mitigated as the share of immigrants increases past the 20-percent mark. While only sixteen metro areas have foreign-born shares over 20 percent, these metro areas are major urban hubs and represent more than 1 in 3 residents in our study.

FIGURE 1

**Predicted Change of Employment From 2008 to 2012 by Proportion of Foreign-Born**

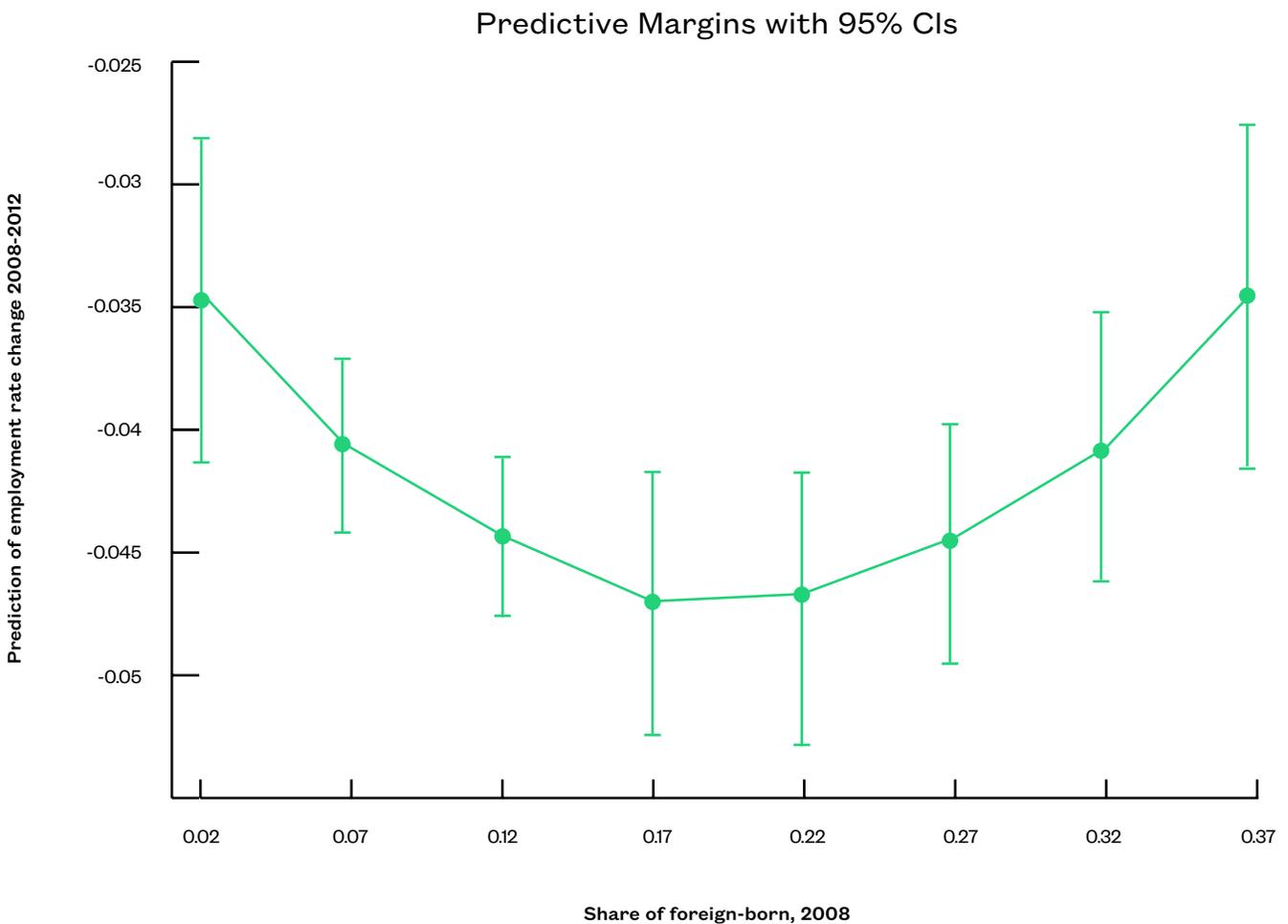
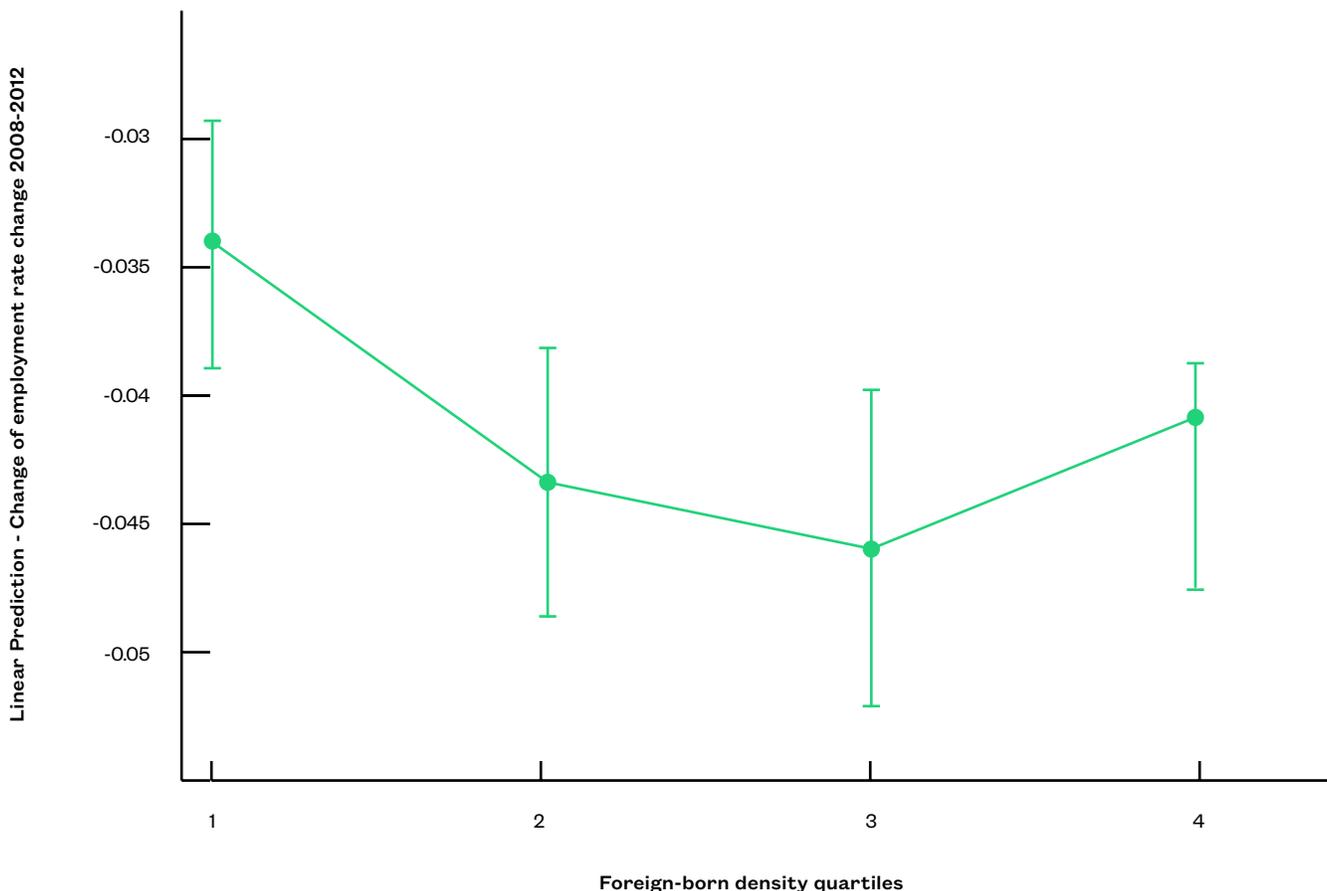


FIGURE 2

Predicted Change of Employment From 2008 to 2012 by Foreign-Born Quartiles

Predictive Margins with 95% CIs



Next, in the recovery model, we control for the same variables and remain focused on the effect of the foreign-born share of the population on employment rates, but this time we apply it to the recovery period, from 2012 to 2015. The results suggest (Figure 3) that the greater the share of foreign-born, the greater the increase in the employment rate during the economic recovery. Table 3 and Figure 3 suggest that, after controlling for differences in metro areas’ recessionary shock, industry, and human capital composition, immigrant density is associated with a speedier recovery. For every 1 additional percentage point of immigrant share of the population in 2012, metro areas are estimated to have a 0.0384 percentage point greater employment rate increase from 2012 to 2015.

To illustrate the results of the recovery model, again consider a hypothetical example, this time of two similarly sized metro areas with workforces of 2 million and similar employment rates. If one metro area has a foreign-born share that is 1 percentage point higher than the other in 2012, it will have approximately 800 additional employed workers by 2015. In other words, for metro areas of this size, every additional 1 percentage point in the foreign-born population is associated with 800 additional employed workers over three years<sup>26</sup>. These small but significant results appear to be driven by the most immigrant-dense metro areas (Figure 4).

26. In the recovery model the association between the share of foreign-born population on the employment rate change from 2012 to 2015 is positive and linear, and we described it by one coefficient and visualized it by an upward-slope line (Figure 3). In contrast, in the recessionary model the effect of the share of foreign-born population on the employment rate change from 2008 to 2012 is U-shaped (i.e. non-linear); therefore, in the interpretation we illustrated the 5 percent, 20 percent, and 35 percent foreign-born share thresholds when explaining the associated employment rate change (Figure 1).

FIGURE 3

**Predicted Change of Employment From 2012 to 2015 by Proportion of Foreign-Born**

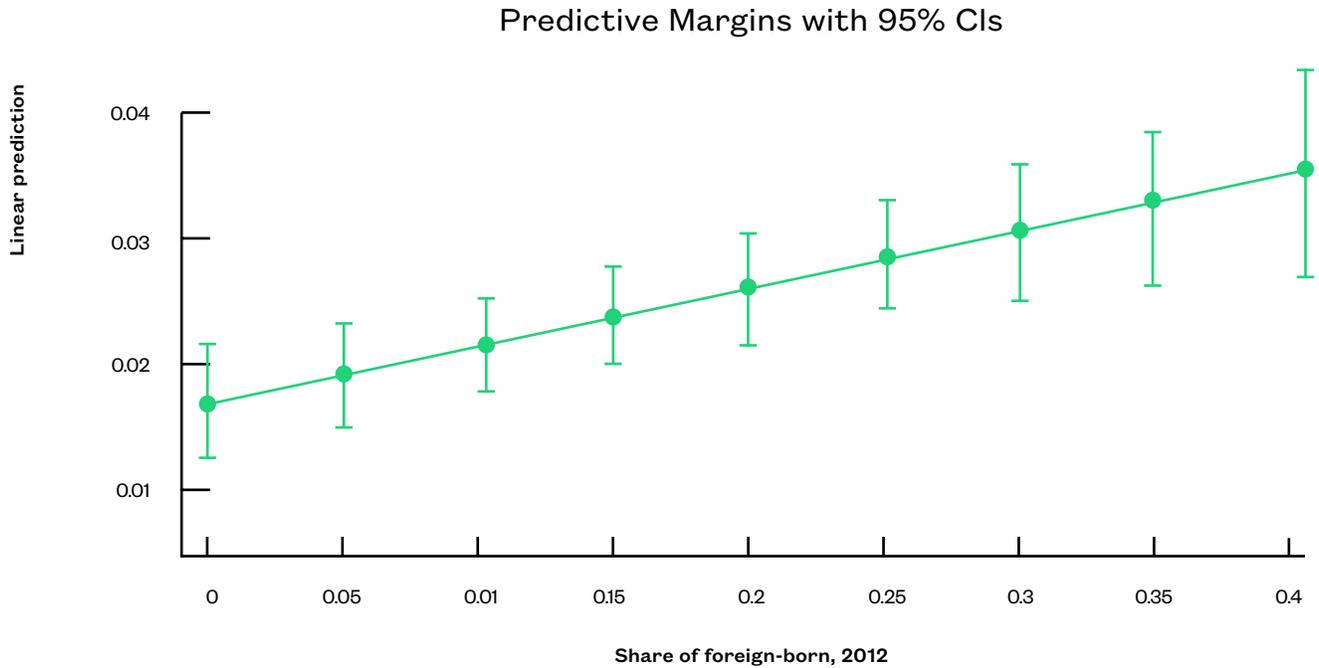
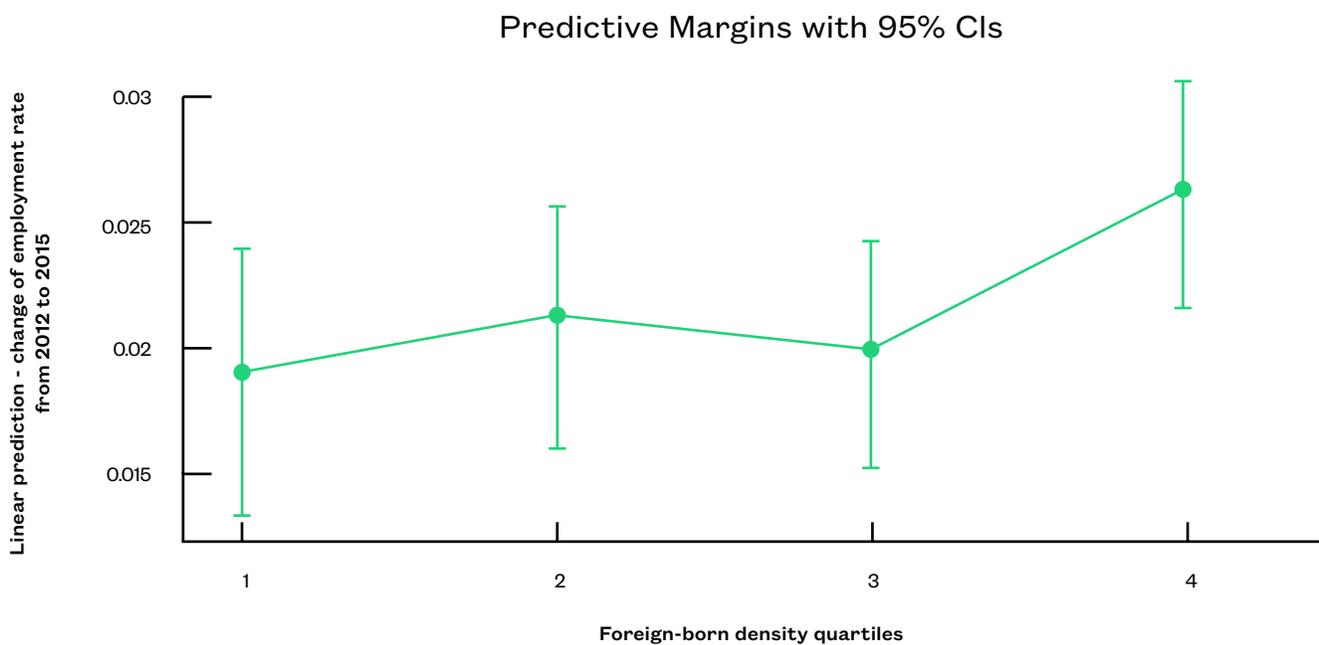


FIGURE 4

**Predicted Change of Employment From 2012 to 2015 by Foreign-Born Quartiles**



We also sought to leverage the panel data structure and estimate the levels of employment rate for 2008, 2012, and 2015 using a fixed effects model. While not significant, the results largely conform to the same trends found in both the recessionary and recovery models. Furthermore, the lower employment rates in 2015 across quartiles, compared to the pre-recession levels, confirms what past research has characterized as a long-tailed recovery.<sup>27</sup>

In sum, the analysis shows that after controlling for the industry and human capital conditions, those metro areas with a higher proportion of immigrants show a sharper employment rate decline from 2008 to 2012. However, the employment loss in the most immigrant-dense metro areas is slightly mitigated; we also found that metro areas with a higher proportion of immigrant population show a quicker recovery compared to metro areas with a low proportion of immigrant population, fully in line with the results of past research.<sup>28</sup> Our analysis reflects that a handful of the most immigrant-dense metro areas, which are both traditional and new gateway cities<sup>29</sup>, play a key role in economic resilience and recovery as drivers of their wider labor markets.

## Data and Methodology

We aggregated separate 1-year datasets of the American Community Survey<sup>30</sup> from 2005, 2008, 2012, and 2015 at the metro area level and selected the 100 most populous metro areas as of 2005. Our main outcome variable is the metro area level employment rate (share of employed in the working age population). Our main variable of interest is the share of foreign-born among the population, which is measured as both continuous and categorical variables (i.e., quartiles). In order to make trends easier to visualize and understand, we generated the four groups based on the proportion of the foreign-born population. The first quartile included the 25 metro areas with the lowest proportion of foreign-born individuals and the fourth quartile included the 25 metro areas with the highest proportion of foreign-born individuals.

In our multivariate analysis, we also controlled for the metro areas' industry mix and level of human capital. Industry mix is measured by the share of workers in construction, manufacturing, wholesale trade, and retail trade. Human capital is measured as the proportion of the working age population with at least a bachelor's degree. See Annex Table 1 for the descriptive statistics of the analytical sample. See Annex Table 2 for the list of metro areas by foreign-born quartiles.

When estimating the change of employment rate, the multivariate analysis includes two linear regression models, one for recessionary resilience and one for recovery. In the recessionary and recovery analyses, we estimate one model that analyzed the changes in employment rate between 2008 and 2012 (the recessionary shock-period), and another model that analyzed the changes between 2012 and 2015 (the recovery-period). The main variable of interest is the continuous measurement of the share of foreign-born. When estimating the level of employment rate across years, we use the fixed effects approach for the years of 2008, 2012, and 2015, so the data points are consistent with the data points of the recessionary and recovery models. The fixed effects analysis estimates the employment rate at the metro level covering 2008, 2012, and 2015 by controlling for the above-mentioned independent variables, foreign-born quartiles, and unobserved heterogeneities. For more details about the fixed effects model see Annex Text Box 1.

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27. U.S. Bureau of Labor Statistics, 2021; Sisk et al., 2018; Bivens, 2016.

28. Kochhar, 2009; Kochhar et al., 2010.

29. Singer, 2013

30. Ruggles et al., 2021.

## Detailed Results

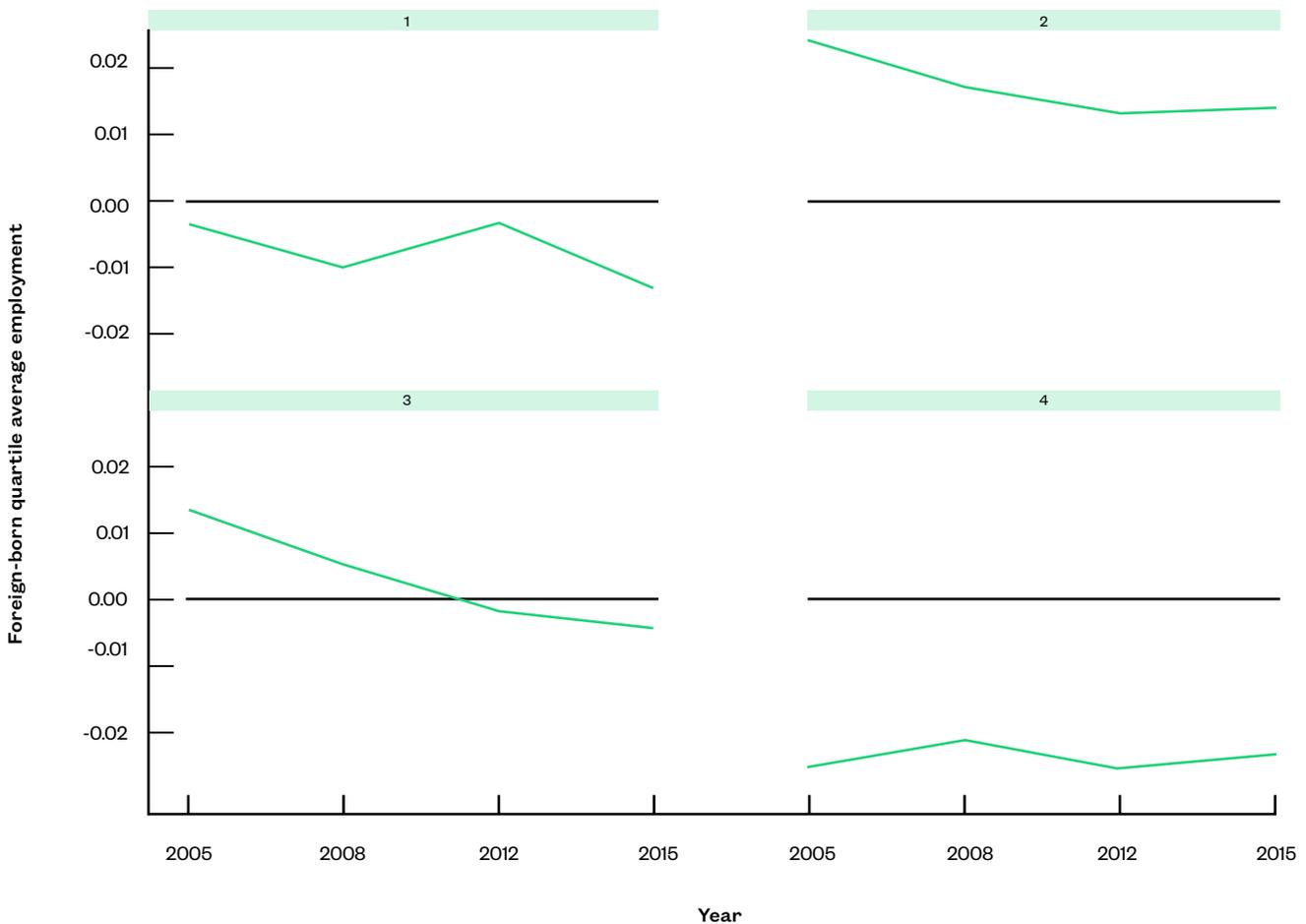
### Descriptive Analysis

Table 1 and Figure 5 show that although metro areas with the highest share of foreign-born populations in 2005 had lower levels of employment than less foreign-born dense metro areas, the expansion of their labor market became more prominent between 2005 and 2008, well positioning these metro areas to resist the subsequent recessionary shock from 2008 to 2012. In addition, compared to the least foreign-born dense metro areas, the most foreign-born dense metro areas exhibited a greater decrease in their employment rate from 2008 to 2012 and a greater increase in their employment rate from 2012 to 2015.

**FIGURE 5**

### Employment Rate Deviation From the Overall Mean by Foreign-Born Quartiles Over Time

100 Most Populous U.S. Metro Areas



Source: U.S. Census Bureau (2005, 2008, 2012, & 2015)

Figure 5 incorporates the overall average of the 100-metro areas’ employment rates across years and displays the deviations from it for the four foreign-born density quartiles. More specifically, in Figure 5 the 100-metro area trend (Columns A to Columns D of Table 1) are set to 0 and the deviations from this trend are plotted by foreign-born quartiles. The most foreign-born dense metro areas had a much lower employment rate in all years compared to the other quartiles and the overall trend. From 2008 to 2012 the first quartile exhibited the greatest recessionary resilience among all metro areas (Column F). When looking at the slope of the lines from 2008 to 2012, Figure 5 and Table 1 (column F) confirm the findings of Kochhar et al. (2010) and suggest that the greater the share of foreign-born population, the greater the employment losses in the beginning of the recession. However, the recessionary decrease of the employment rate from 2008 to 2012 was lower in the fourth quartile than in the second or third quartiles, signaling a slightly greater resilience. Regarding the recovery, Figure 5 and Table 1 (Column G) show that from 2012 to 2015 the employment rate of the fourth quartile moved toward the mean, outperforming all other quartiles over the same period, suggesting that the most foreign-born dense metro areas had a slightly quicker initial recovery compared to the less immigrant-dense metro areas.

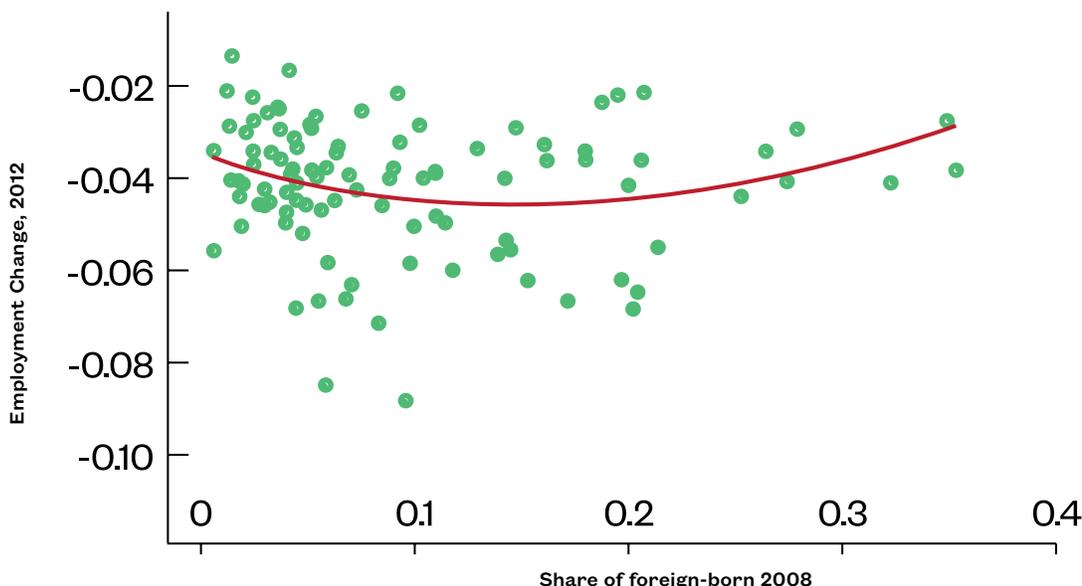
## Multivariate Analysis

### Resilience Model

The resilience model analyzes the employment rate change from 2008 to 2012. Figure 6 shows the change of employment rate from 2008 to 2012 by the proportion of the foreign-born population in the most populous 100 metro areas in the United States. It shows that the greater the proportion of the foreign-born population, the greater the employment rate loss from 2008 to 2012. However, the most immigrant-dense metro areas exhibit a less-sharp employment rate loss and drive the curve-linear relationship between employment rate and foreign-born density. These metro areas are El Paso, TX; Los Angeles-Long Beach-Anaheim, CA; McAllen-Edinburg-Mission, TX; Miami-Fort Lauderdale-Pompano Beach, FL; New York-Newark-Jersey City, NY-NJ-PA; San Francisco-Oakland-Berkeley, CA; San Jose-Sunnyvale-Santa Clara, CA. These metro areas are traditional and new gateway cities<sup>31</sup> and key economic drivers of their wider labor markets.

FIGURE 6

### Employment Rate Change 2008-2012 by Share of Foreign-Born Population



31. Singer, 2013.

The multivariate resilience model predicts the change in employment rate between 2008 and 2012 by controlling for the share of foreign-born in 2008, the industry mix in 2008, the share of those who have a bachelor’s degree in 2008, and the underlying growth measured by the employment rate change between 2005 and 2008. The resilience model includes a quadratic relationship between the share of foreign-born population and the change in employment from 2008 to 2012.

The model<sup>32</sup>:

$$\Delta Y(2008-2012) = \alpha + \beta Xi(2008) + \gamma Z(2005-2008) + \mu it$$

The results of Table 2 suggest that a higher foreign-born density is associated with a U-shape pattern of employment rate change from 2008 to 2012. More specifically, the higher the foreign-born density, the greater the employment rate decrease from 2008 to 2012. However, in metro areas where the share of the foreign-born population is about 20 percent or more (Figure 1<sup>33</sup>), the drop of employment rate from 2008 to 2012 is somewhat mitigated even though it is still negative. This result suggests that the relationship between foreign-born density and the change of employment rate varies by the foreign-born density distribution.

TABLE 2

**Resilience Model — Change of Employment Rate, 2008-2012, Linear Regression**

	Employment Change 2008-2012
Share of foreign-born 2008	-0.153** (-2.69)
Share of foreign-born 2008 <sup>2</sup>	0.396** (2.90)
Share of construction 2008	-0.163 (-1.65)
Share of manufacturing 2008	-0.034 (-1.04)
Share of trade 2008	-0.187* (-1.99)
Share of graduate & above 2008	0.067** (2.82)
Employment rate change 2005-2008	0.157 (1.94)
_cons	-0.008 (-0.38)
N	100
R-squared	0.344

*t* statistics in parentheses

\* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001

32. Where  $\Delta Y(2008-2012)$  is the change of employment rate from 2008 to 2012 as a function of  $Xi(2008)$  (the share of foreign-born in 2008, the square of the share of foreign-born in 2008, the industry mix in 2008, and the share of those who have at least a bachelor’s degree in 2008),  $Z(2005-2008)$  the underlying growth measured by the employment rate change between 2005-2008, and  $\mu it$  is the error term.

33. Figure 1 predicts the unemployment rate decrease based on the model of Table 2 and shows the relationship between the share of foreign-born and the change of employment rate (when explanatory variables are held at their average).

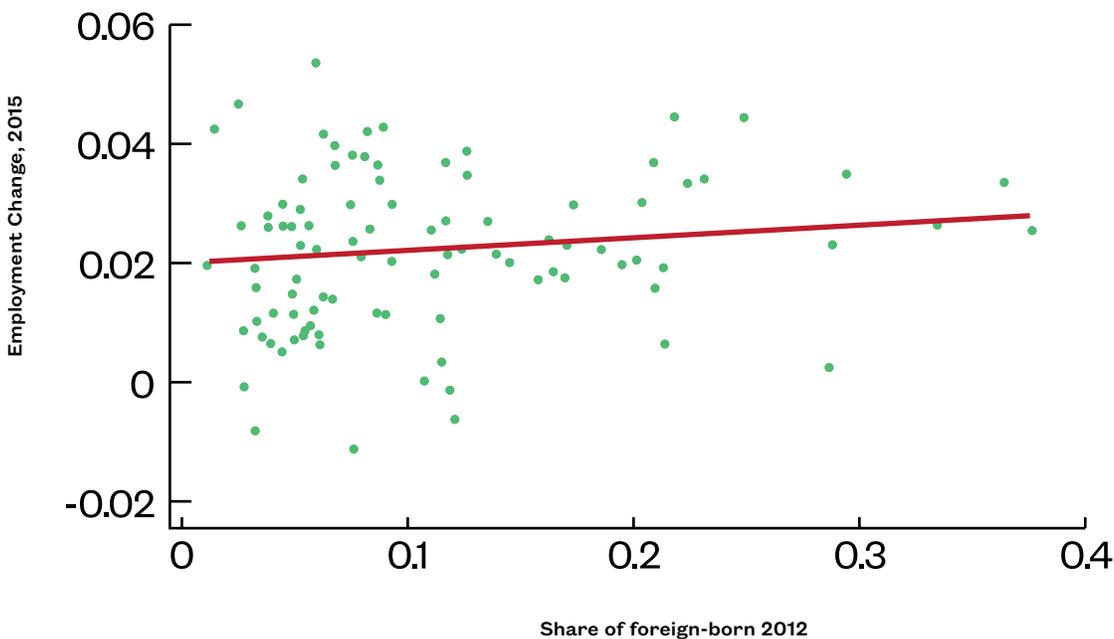
Given that the relationship between foreign-born density and the change of employment rate from 2008 to 2012 varies by the foreign-born density distribution, we estimated the recessionary model by the foreign-born quartiles (see Annex Table 3). Figure 2 shows the predicted employment rate change from 2008 to 2012 based on model Annex Table 3. In this model we use the foreign-born quartiles rather than the continuous version of the share of foreign-born. Figure 2 shows that the loss of employment rate was substantial in all foreign-born quartiles. The first quartile seems to have handled the recessionary shock the best. Compared to the first quartile, the second and third handled the recession the worst, and the fourth somewhat better than the second and third but worse than the first. The fourth quartile includes the top 25 most immigrant-dense metro areas, ranging from a 15 percent to a 37 percent share (see Annex Table 2). The predictions of Figure 2 for the fourth quartile are deflated by the wide range of foreign-born densities in this group and the curve we observe in the Figure 1 flattens.

**Recovery Model**

Figure 3 shows the change of employment rate from 2012 to 2015 by the proportion of the foreign-born population in the most populous 100 metro areas in the United States. The chart shows that the greater the share of the foreign-born population, the greater the employment rate gain from 2012 to 2015. The metro areas, which seem to drive the positive linear trend, are the same as those we detected in Figure 6: El Paso, TX; Los Angeles-Long Beach-Anaheim, CA; McAllen-Edinburg-Mission, TX; Miami-Fort Lauderdale-Pompano Beach, FL; New York-Newark-Jersey City, NY-NJ-PA; San Francisco-Oakland-Berkeley, CA; San Jose-Sunnyvale-Santa Clara, CA. Again, these metro areas are traditional and new gateway cities<sup>34</sup> and economic drivers of their wider labor markets.

FIGURE 7

**Employment Rate Change 2012-2015 by Share of Foreign-Born Population**



34. Singer, 2013.

Figure 7 shows the weak, but positive, association between the share of foreign-born in 2012 and the employment rate change from 2012 to 2015 at the metro area level. We further elaborate this bivariate relationship with the recovery model (Table 3), where we estimate the change in employment rate between 2012-2015 by controlling for the share of foreign-born in 2012, the industry mix in 2012, the share of those who have a bachelor’s degree in 2012, and the magnitude of the recession as measured by the employment rate change between 2008 and 2012. We control for the magnitude of the recession because, based on the 'plucking model'<sup>35</sup> suggested by Milton Friedman (1964 and revisited in 1993)<sup>36</sup> (cited by Claeys et al., 2015), the size of the recession predicts the growth rate in the recovery.

The model<sup>37</sup>:

$$\Delta Y(2012-2015) = \alpha + \beta Xi(2012) + \gamma Z(2008-2012) + \mu it$$

Table 3 shows that, holding everything else equal, for each additional percentage point of immigrant population in 2012, metro areas are estimated to have a 0.038 percentage point higher employment rate change from 2012 to 2015.

**TABLE 3**

**Recovery Model — Change of Employment Rate, 2012-2015, Linear Regression**

	Employment Change 2012-2015
Share of foreign-born 2012	<b>0.038**</b> (2.82)
Share of construction 2012	-0.073 (-0.78)
Share of manufacturing 2012	<b>0.122***</b> (3.58)
Share of trade 2012	-0.083 (-0.86)
Share of graduate & above 2012	0.031 (1.20)
Share of graduate & above 2008	<b>0.067**</b> (2.82)
Employment rate change 2008-2012	<b>-0.529***</b> (-6.02)
_cons	-0.009 (-0.44)
N	100
R-squared	0.383

*t* statistics in parentheses

\* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001

35. Claeys et al., 2015.

36. Friedman, 1993.

37. Where  $\Delta Y(2012-2015)$  is the change of employment rate from 2012 to 2015 as a function of  $Xi(2012)$  (the share of foreign-born in 2012, the industry mix in 2012, and the share of those who have at least a bachelor's degree in 2012) and  $Z(2008-2012)$  the underlying employment rate change between 2008-2012.  $\mu it$  is the error term.

Table 3 suggests that there is a statistically significant positive relationship between the share of foreign-born and the subsequent change in employment rate, suggesting that metro areas with a higher share of foreign-born population in 2012 exhibit a greater increase of employment rate from 2012 to 2015.

We calculated the recovery model by using the foreign-born quartiles (see Annex Table 4). When the foreign-born quartiles are included in the model rather than the share of foreign-born, Figure 4 shows that the stronger recovery among foreign-born dense metro areas appears to be driven by the fourth quartile (i.e. metro areas that have the highest proportion of foreign-born population).

The recessionary and the recovery models estimate the change of employment rate in 2008 to 2012 and 2012 to 2015, respectively. If we want to account for metro-level heterogeneity and we are interested in assessing how much the employment rate recovered from 2008 to 2015, we need to use panel data techniques. The next section presents the results of a fixed effects model covering the years of 2008, 2012, and 2015.

## Alternative Estimation and Discussion

The panel data structure gives us the opportunity to model the recessionary and recovery trajectories at the same time using a fixed effects model. We estimate the trend of employment rates for the years of 2008, 2012, and 2015 and gain some insights into how complete the recovery was by 2015. The reference year of our fixed effects model is 2008. We include all the previously used control variables, such as the measurements of industry and human capital mix and the foreign-born quartiles. The fixed effects estimator also accounts for all the remaining differences among metro areas that we did not explicitly control for. The results largely confirm the recessionary and recovery models' findings, even though some of the key coefficients lost their significance levels.

Details of the fixed effects model are in Annex Text Box 1. Results of the fixed effects model are in Annex Table 5. Predictions based on the fixed effects model are in Annex Figure 1.

The predictions based on the fixed effects model largely point to the same direction as the predictions retrieved from the recessionary and the recovery models. Based on the recessionary model and the fixed effects model, the predicted decrease in the employment rate between 2008 and 2012 is more severe in Quarter 4 compared to Quarter 1 (though not significant in the fixed effects model) but slightly less so compared to Quarter 2 and Quarter 3<sup>38</sup>. Based on both the recovery model and the fixed effects model, the predicted increase in the employment rate between 2012 and 2015 is steeper in Quarter 4 compared to Quarter 1 (though not significant in the fixed effects model)<sup>39</sup>.

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38. The prediction of the recessionary model (Figure 2) relates to the slope of Annex Figure 1 between 2008 and 2012.

39. The prediction of the recovery model (Figure 4) relates to the slope of Annex Figure 1 between 2012 and 2015.

## Conclusion

In sum, our analysis finds that metro areas with a relatively larger immigrant population suffered from sharper employment declines during the Great Recession with the exception of the most immigrant-dense metro areas, where losses were less severe than expected. We also find that metro areas with a higher proportion of immigrant population recovered more quickly compared to metro areas with lower proportions of immigrant population. Our analysis reflects that a handful of the most immigrant-dense metro areas — which are both traditional and new gateway cities<sup>40</sup> — play a key role in economic resilience and recovery as drivers of their wider labor markets.

How applicable are these findings to the Covid-19 recession? Although it is too early to fully assess how the pandemic has affected the U.S. labor market, it is highly likely that workers who are female, young, less educated, Black, or Hispanic, or who work generally in service occupations, social industries, and non-essential occupations were disproportionately negatively impacted.<sup>41</sup> Additionally, given that the pandemic recession was caused by an outside shock (i.e., Covid-19 virus) the overall shape of the recovery remains an open question. While the vaccine rollout may quickly mitigate the negative labor market impact of the pandemic in certain areas, vaccine hesitancy could slow the speed of the recovery in other areas. As such, further research is needed to fully assess how the pandemic recession affects immigrant workers in urban areas.

Lastly, while the impact of localized policy initiatives is beyond the scope of this current analysis, findings from NAE's Cities Index have already indicated how immigrant-inclusive policies may soften the blow from the pandemic and increase a city's economy resiliency. Despite the constitutional mandate that the federal government set immigration policy — controlling who can enter and settle in the United States — states and metro areas retain important policymaking abilities of their own. By creating and enforcing a wide range of economic and social policies — a minimum wage, social programs, access to business capital, etc. — states and municipalities can mitigate the impact of economic downturns.<sup>42</sup> Even demographically and economically similar metro areas may exist in vastly different policy landscapes and ultimately reach different outcomes.

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40. Singer, 2013.

41. Shibata, 2020.

42. Sisk et al., 2018.

## Appendix

**Annex Table 1: Descriptive Statistics of Analytical Sample**

	Mean	Standard Error	[95% Conf. Interval]	
<b>1st Quartile</b>				
Employment rate	0.69	0.003	0.69	0.70
Share of construction	0.06	0.001	0.06	0.07
Share of manufacturing	0.12	0.003	0.11	0.12
Share of trade	0.15	0.001	0.14	0.15
Share of graduates & above	0.25	0.003	0.24	0.25
Share of foreign-born	0.04	0.001	0.04	0.04
<b>2nd Quartile</b>				
Employment rate	0.72	0.004	0.71	0.72
Share of construction	0.07	0.002	0.06	0.07
Share of manufacturing	0.12	0.005	0.11	0.13
Share of trade	0.15	0.001	0.14	0.15
Share of graduates & above	0.27	0.004	0.27	0.28
Share of foreign-born	0.07	0.001	0.07	0.07
<b>3rd Quartile</b>				
Employment rate	0.70	0.004	0.70	0.71
Share of construction	0.07	0.002	0.07	0.08
Share of manufacturing	0.10	0.003	0.09	0.10
Share of trade	0.15	0.001	0.14	0.15
Share of graduates & above	0.28	0.005	0.27	0.30
Share of foreign-born	0.11	0.002	0.11	0.12
<b>4th Quartile</b>				
Employment rate	0.68	0.005	0.67	0.69
Share of construction	0.07	0.002	0.07	0.08
Share of manufacturing	0.08	0.004	0.08	0.09
Share of trade	0.15	0.002	0.14	0.15
Share of graduates & above	0.27	0.010	0.25	0.28
Share of foreign-born	0.23	0.006	0.22	0.24

**ARE IMMIGRANTS-HEAVY METRO AREAS MORE ECONOMICALLY RESILIENT? LESSONS FROM THE GREAT RECESSION**

	Mean	Standard Error	[95% Conf. Interval]	
<b>All Metro Areas</b>				
Employment rate	0.70	0.00	0.69	0.70
Share of construction	0.07	0.00	0.07	0.07
Share of manufacturing	0.11	0.00	0.10	0.11
Share of trade	0.15	0.00	0.14	0.15
Share of graduates & above	0.27	0.00	0.26	0.27
Share of foreign-born	0.11	0.00	0.11	0.12

Source: American Community Survey, IPUMS.

**Annex Table 2: MSAs by Foreign-Born Density Quartiles**

1st Quartile		2nd Quartile	
MSA Name	Share of Foreign-Born	MSA Name	Share of Foreign-Born
Youngstown-Warren-Boardman, OH PA	0.021	Lansing-East Lansing, MI	0.051
Jackson, MS	0.021	Ogden-Clearfield, UT	0.052
Baton Rouge, LA	0.027	Grand Rapids-Kentwood, MI	0.052
Scranton--Wilkes-Barre, PA	0.028	Greenville-Anderson, SC	0.055
Knoxville, TN	0.029	Omaha-Council Bluffs, NE IA	0.057
Pittsburgh, PA	0.029	Des Moines-West Des Moines, IA	0.058
Birmingham-Hoover, AL	0.032	Columbus, OH	0.059
Dayton-Kettering, OH	0.033	Winston-Salem, NC	0.059
Toledo, OH	0.034	Richmond, VA	0.060
Augusta-Richmond County, GA SC	0.035	Cleveland-Elyria, OH	0.060
Cincinnati, OH-KY IN	0.036	Madison, WI	0.060
Charleston-North Charleston, SC	0.039	Wichita, KS	0.063
St. Louis, MO IL	0.039	Kansas City, MO KS	0.064
Little Rock-North Little Rock-Conway, AR	0.040	Rochester, NY	0.066
Louisville/Jefferson County, KY IN	0.040	Albany-Schenectady-Troy, NY	0.067
Akron, OH	0.042	Oklahoma City, OK	0.069
Memphis, TN-MS AR	0.045	Nashville-Davidson--Murfreesboro--Franklin,	0.069
Harrisburg-Carlisle, PA	0.045	Jacksonville, FL	0.070
Columbia, SC	0.046	Milwaukee-Waukesha, WI	0.071
Syracuse, NY	0.047	Deltona-Daytona Beach-Ormond Beach, FL	0.073
Indianapolis-Carmel-Anderson, IN	0.048	Boise City, ID	0.074
Buffalo-Cheektowaga, NY	0.051	Greensboro-High Point, NC	0.074
Virginia Beach-Norfolk-Newport News, VA NC	0.055	Allentown-Bethlehem-Easton, PA NJ	0.078
Tulsa, OK	0.055	Baltimore-Columbia-Towson, MD	0.079
New Orleans-Metairie, LA	0.056	Charlotte-Concord-Gastonia, NC SC	0.086

**ARE IMMIGRANTS-HEAVY METRO AREAS MORE ECONOMICALLY RESILIENT? LESSONS FROM THE GREAT RECESSION**

3rd Quartile		4th Quartile	
MSA Name	Share of Foreign-Born	MSA Name	Share of Foreign-Born
Colorado Springs, CO	0.067	Orlando-Kissimmee-Sanford, FL	0.158
Springfield, MA	0.078	Phoenix-Mesa-Chandler, AZ	0.160
Palm Bay-Melbourne-Titusville, FL	0.083	Boston-Cambridge-Newton, MA NH	0.163
Detroit-Warren-Dearborn, MI	0.084	Sacramento-Roseville-Folsom, CA	0.168
Philadelphia-Camden-Wilmington, PA-NJ-DE	0.088	Dallas-Fort Worth-Arlington, TX	0.176
Minneapolis-St. Paul-Bloomington, MN WI	0.090	Chicago-Naperville-Elgin, IL-IN WI	0.177
Albuquerque, NM	0.098	Modesto, CA	0.187
Worcester, MA CT	0.100	Urban Honolulu, HI	0.195
Poughkeepsie-Newburgh-Middletown, NY	0.103	Bakersfield, CA	0.196
North Port-Sarasota-Bradenton, FL	0.105	Washington-Arlington-Alexandria, DC-VA-MD	0.203
San Antonio-New Braunfels, TX	0.107	Bridgeport-Stamford-Norwalk, CT	0.211
Raleigh-Cary, NC	0.108	Fresno, CA	0.212
Lakeland-Winter Haven, FL	0.111	Houston-The Woodlands-Sugar Land, TX	0.216
New Haven-Milford, CT	0.113	Riverside-San Bernardino-Ontario, CA	0.218
Tampa-St. Petersburg-Clearwater, FL	0.115	Las Vegas-Henderson-Paradise, NV	0.220
Hartford-East Hartford-Middletown, CT	0.118	San Diego-Chula Vista-Carlsbad, CA	0.222
Providence-Warwick, RI MA	0.119	Oxnard-Thousand Oaks-Ventura, CA	0.223
Salt Lake City, UT	0.125	Stockton, CA	0.230
Denver-Aurora-Lakewood, CO	0.125	El Paso, TX	0.269
Portland-Vancouver-Hillsboro, OR WA	0.125	New York-Newark-Jersey City, NY-NJ PA	0.280
Tucson, AZ	0.130	McAllen-Edinburg-Mission, TX	0.290
Atlanta-Sandy Springs-Alpharetta, GA	0.133	San Francisco-Oakland-Berkeley, CA	0.295
Austin-Round Rock-Georgetown, TX	0.145	Los Angeles-Long Beach-Anaheim, CA	0.339
Cape Coral-Fort Myers, FL	0.154	San Jose-Sunnyvale-Santa Clara, CA	0.365
Seattle-Tacoma-Bellevue, WA	0.158	Miami-Fort Lauderdale-Pompano Beach, FL	0.370

**Annex Table 3: Recessionary Model by Foreign-Born Quartiles, Linear Regression**

	Employment change 2008-2012
1st fb quarter	Ref. (.)
2nd fb quarter	-0.10** (-2.65)
3rd fb quarter	-0.011** (-2.90)
4th fb quarter	-0.009* (-2.31)
Share of construction 2012	-0.167 (-1.78)
Share of manufacturing 2012	-0.015 (-0.47)
Share of trade 2012	-0.143 (-1.61)
Share of graduate & above 2012	0.083** (3.34)
Employment rate change 2008-2012	0.142 (1.84)
_cons	-0.022 (-1.09)
<i>N</i>	100
<i>R</i> -squared	0.373

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Annex Table 4: Recovery Model by Foreign-Born Quartiles, Linear Regression**

	Employment change 2008-2012
1st fb quarter	Ref. (.)
2nd fb quarter	0.002 (0.54)
3rd fb quarter	0.001 (0.28)
4th fb quarter	0.008* (2.30)
Share of construction 2012	-0.058 (-0.60)
Share of manufacturing 2012	0.121*** (3.50)
Share of trade 2012	-0.055 (-0.57)
Share of graduate & above 2012	0.040 (1.48)
Employment rate change 2008-2012	-0.530*** (-5.45)
_cons	-0.015 (-0.69)
<i>N</i>	100
<i>R</i> -squared	0.386

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Annex Text Box 1 — Fixed Effects Model:**

$$Y_{it} = \beta X_{it} + \alpha_i + \mu_{it}$$

Where  $Y_{it}$  is the employment rate for the 100 metro areas for 2008, 2012, and 2015 as a function of  $\alpha_i$  unknown intercept for each metro area,  $X_{it}$  denotes the observed independent variables, such as the industry and human capital mix of metro areas, the time period intercepts of year dummies, the foreign-born quartiles and the interaction term of year dummies and foreign-born quartiles, which latter is our main focus of interest.  $\beta$  denotes the coefficients of the independent variables.  $\mu_{it}$  is the error term.

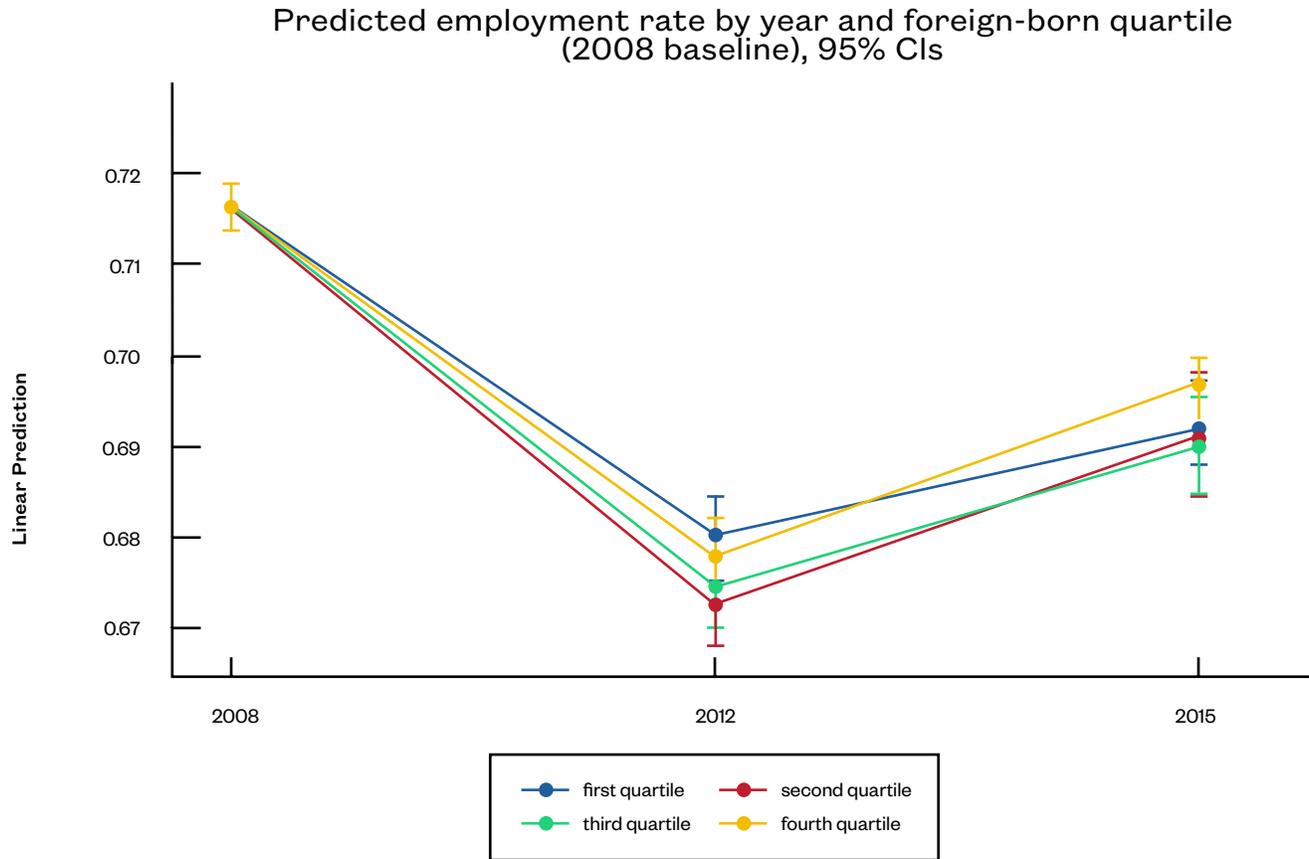
**Annex Table 5: Employment Rate in the 100 Most Populous Metro Areas, 2008-2012-2015, Fixed Effects Model**

	Employment change 2008-2012 Standard Error
2008	Ref. (.)
2012	-0.037*** (-14.44)
2015	-0.025*** (-8.18)
2008#1.fb_quart	Ref. (.)
2008#2.fb_quart	Ref. (.)
2008#3.fb_quart	Ref. (.)
2008#4.fb_quart	Ref. (.)
2012#1.fb_quart	Ref. (.)
2012#2.fb_quart	-0.007* (-2.03)
2012#3.fb_quart	-0.005 (-1.37)
2012#4.fb_quart	-0.002 (-0.67)
2015#1.fb_quart	Ref. (.)
2015#2.fb_quart	-0.001 (-0.30)
2015#3.fb_quart	-0.002 (-0.68)
2015#4.fb_quart	0.004 (1.20)
Share of graduate & above	0.405*** (5.57)
Share of construction	0.362** (3.19)
Share of manufacturing	0.031 (0.30)
Share of trade	-0.031 (-0.35)
_cons	0.584*** (20.72)
<i>N</i>	300
<i>R</i> -squared overall	0.550
<i>R</i> -squared within	0.931
<i>R</i> -squared between	0.447

*t* statistics in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

**Annex Figure 1: Predicted Employment Rate, 2008, 2012, and 2015 by Foreign-Born Quartiles, Fixed**



Annex Figure 1 shows that the loss of employment from 2008 to 2012 was substantial in all foreign-born quartiles. The employment loss was significantly more severe in the second quartile than in the first quartile. The employment loss of the third and especially the fourth quartile were greater (although not significant) than the first but somewhat smaller (although not significant) than that of the second quartile. These coefficients are consistent (although not significant) with the findings of the recessionary model of Figure 2 and Annex Table 3. The employment rate in 2015 was lower in all foreign-born quartiles compared to the pre-recession levels in 2008. However, as Annex Figure 1 shows, the predicted employment rates based on Annex Table 5 reveal an employment rate increase for all quartiles from 2012 to 2015. Annex Figure 1 also shows that in the most immigrant-dense metro areas, the recovery may have been slightly quicker (although not significant) compared to the least immigrant-dense metro areas<sup>43</sup>. These results are largely consistent (although not significant) with the recovery model of Figure 4 and Annex Table 4.

43. In Annex Table 5 the coefficient of the 4th quartile turns positive, though not significant, while the coefficients of the 2nd and 3rd quartiles are still negative, though not significant.

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