



# Immigrant Job Insights: Trends, Shifts & Forecasts

Forecasting occupational trends among immigrants using two decades of U.S. lawful permanent residency data.



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# Project Idea

The project originated from my job search experiences as a final-year student. I noticed the oversupply of data analysts compared to market demand.



## Personal Challenge

Facing competitive job market as a soon-to-graduate student

## Market Observation

Discovered potential oversaturation in data analyst positions

## Visa Considerations

Added complexity of navigating immigration status for employment

## Research Question

What occupational trends might emerge for immigrants in next 5 years?

# Data Acquisition Challenge

## 1 Web Scraping

4,000+ Excel files scattered across the Office of Homeland Security Statistics website

## 2 Automation

Selenium script to navigate and download files

## 3 Complete Collection

18 years of data covering 200+ countries and continents

## Profiles by Country of Birth

Fiscal Year:

All ▾

Country:

All

**Apply Filters**

**Reset Filters**

Showing 11 to 20 of 4,072 files

### Country

[Albania - FY 2022](#)

[Algeria - FY 2022](#)

[Angola - FY 2022](#)

[Anguilla - FY 2022](#)

[Antigua and Barbuda - FY 2022](#)

[Argentina - FY 2022](#)

[Armenia - FY 2022](#)

[Aruba - FY 2022](#)

[Australia - FY 2022](#)

[Austria - FY 2022](#)

Made with **GAMMA**

```
standardize_region_name(region)
"""
Standardize region names to handle variations
"""

region_mapping = {
# Variations for countries with
    "Bahamas": "Bahamas",
    "Bahamas, The": "Bahamas",
    "Gambia": "Gambia",
    "Gambia, The": "Gambia",

# Countries that changed names
    "Czechia": "Czech Republic",
    "Czech Republic": "Czech Republic",
    "Czechoslovakia (former)": "Czech Republic",
    "Eswatini": "Eswatini",
    "Eswatini (formerly Swaziland)": "Eswatini",
    "Swaziland": "Eswatini",
```

# Data Merging Cleaning Challenges



## Country Name Changes

Created mapping dictionary for consistency

## Inconsistent Structures

Different headers and formats across files

## Special Data Codes

Replaced 'D' with mean values by category

How I extracted the file

**Persons Obtaining Lawful Permanent Resident Status During Fiscal Year 2022  
by Region/Country of Birth and Selected Characteristics**

**Region/Country: Brazil**

Characteristic	Total	Female	Male	Unknown
Total	24,169	13,553	10,615	1
New arrivals	6,067	3,286	2,781	0
Adjustments of status	18,102	10,267	7,834	1
Age				
Under 18 years	3,824	1,958	1,866	0
18 to 24 years	2,405	1,329	1,076	0
25 to 34 years	5,766	3,531	2,235	0
35 to 44 years	6,549	3,535	3,013	1
45 to 54 years	3,322	1,864	1,458	0
55 to 64 years	1,557	874	683	0
65 years and over	746	462	284	0
Unknown	0	0	0	0
Marital status				
Married	16,516	9,488	7,027	1
Single	6,505	3,293	3,212	0
Other	910	660	250	0
Unknown	238	112	126	0
Occupation				
Management, professional, and related occupations	4,046	1,933	2,113	0
Service occupations	637	407	229	1
Sales and office occupations	1,556	958	598	0
Farming, fishing, and forestry occupations	45	D	D	0
Construction, extraction, maintenance and repair occupations	235	11	224	0
Production, transportation, and material moving occupations	619	212	407	0
Military	23	D	D	0
No occupation/not working outside home	6,292	3,748	2,544	0
Homemakers	615	597	18	0
Students or children	4,466	2,316	2,150	0
Retirees	16	11	5	0
Unemployed	1,195	824	371	0
Unknown	10,716	6,273	4,443	0

What was the end file format

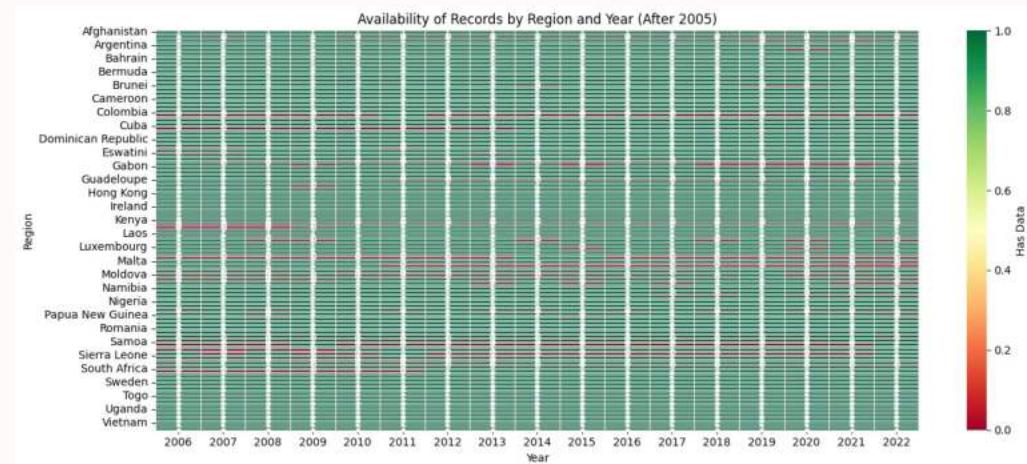
Total	Male	Female	Unknown	Year	Region	Group	Subgroup
4321	2193	2128	0	2014	Jamaica	Age	Under 18 years
2638	1324	1314	0	2014	Jamaica	Age	18 to 24 years
3517	1748	1769	0	2014	Jamaica	Age	25 to 34 years
3507	1529	1978	0	2014	Jamaica	Age	35 to 44 years
2887	1053	1834	0	2014	Jamaica	Age	45 to 54 years
1477	514	963	0	2014	Jamaica	Age	55 to 64 years
679	232	447	0	2014	Jamaica	Age	65 years and over
0	0	0	0	2014	Jamaica	Age	Unknown
1157	445	712	0	2014	Jamaica	Occupation	Management, professional, and related occupations
2136	985	1151	0	2014	Jamaica	Occupation	Service occupations
440	80.6857143	102.468085	0	2014	Jamaica	Occupation	Sales and office occupations
297	210	87	0	2014	Jamaica	Occupation	Farming, fishing, and forestry occupations
328	319	9	0	2014	Jamaica	Occupation	Construction, extraction, maintenance and repair occupations
296	254	42	0	2014	Jamaica	Occupation	Production, transportation, and material moving occupations
4	0.0755814	0	0	2014	Jamaica	Occupation	Military
8401	3675	4726	0	2014	Jamaica	Occupation	No occupation/not working outside home
675	23	652	0	2014	Jamaica	Occupation	Homemakers
5744	2847	2897	0	2014	Jamaica	Occupation	Students or children
100	40	60	0	2014	Jamaica	Occupation	Retirees
1882	765	1117	0	2014	Jamaica	Occupation	Unemployed
5967	2566	3401	0	2014	Jamaica	Occupation	Unknown
6379	3078	3301	0	2014	Jamaica	Broad Class of Admissior	Family-sponsored preferences
629	260	369	0	2014	Jamaica	Broad Class of Admissior	Employment-based preferences
11917	5204	6713	0	2014	Jamaica	Broad Class of Admissior	Immediate relatives of U.S. citizens
4	351.284879	434.205804	0	2014	Jamaica	Broad Class of Admissior	Diversity
44	351.284879	434.205804	0	2014	Jamaica	Broad Class of Admissior	Refugees and asylees
53	17	36	0	2014	Jamaica	Broad Class of Admissior	Other
634	321	312	1	2013	Japan	Age	Under 18 years
286	76	209	1	2013	Japan	Age	18 to 24 years
1903	313	1579	11	2013	Japan	Age	25 to 34 years
2022	606	1411	5	2013	Japan	Age	35 to 44 years
621	206	411	4	2013	Japan	Age	45 to 54 years
157	74	83	0	2013	Japan	Age	55 to 64 years

# Initial Data Exploration

```
occupation_years = df[df['Group'] == 'Occupation'].groupby('Subgroup')['Year'].unique()
print(occupation_years)

✓ 0.1s

Subgroup
Administrative support [2005]
Construction, extraction, maintenance and repair occupations [2005]
Executive and managerial [2005]
Farming, fishing, and forestry occupations [2005]
Farming, forestry, fisheries [2005]
Homemakers [2005]
Management, professional, and related occupations [2005]
Military [2005]
No occupation [2005]
```



## Basic Inspection

Identified classification changes pre-2006

## Continuity Check

Created heatmap to identify data gaps

# Data Transformation

## Before

Complex Excel tables with inconsistent formatting

Multiple sections with headers and footers

Special codes and continental totals

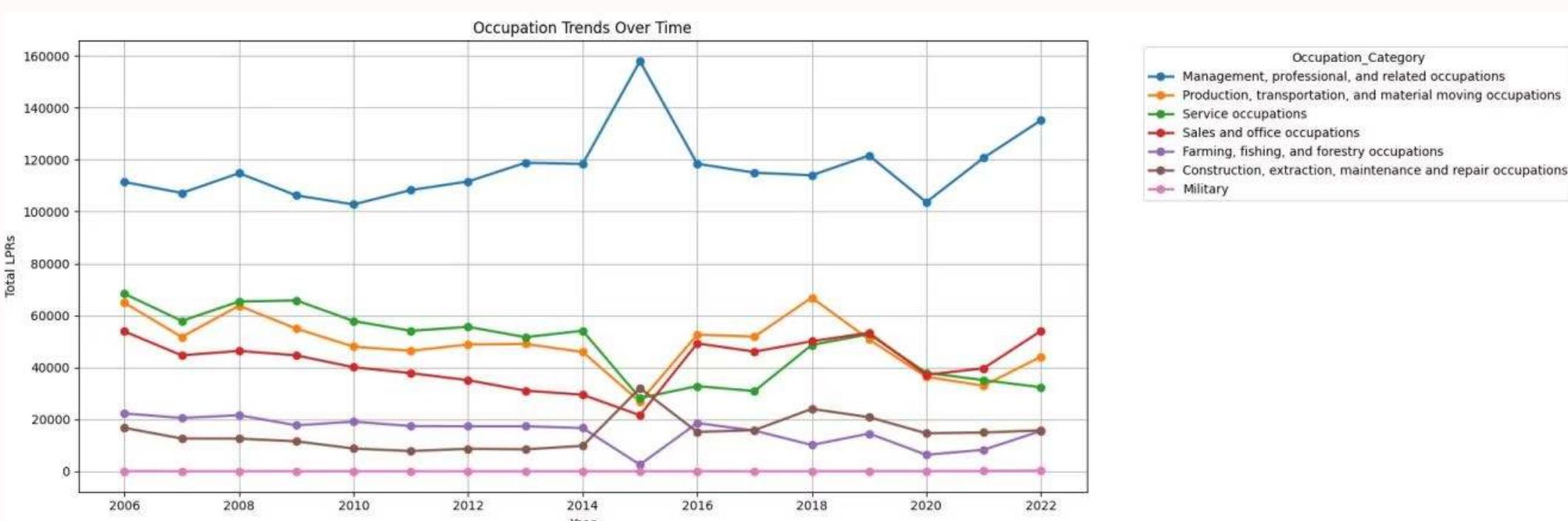
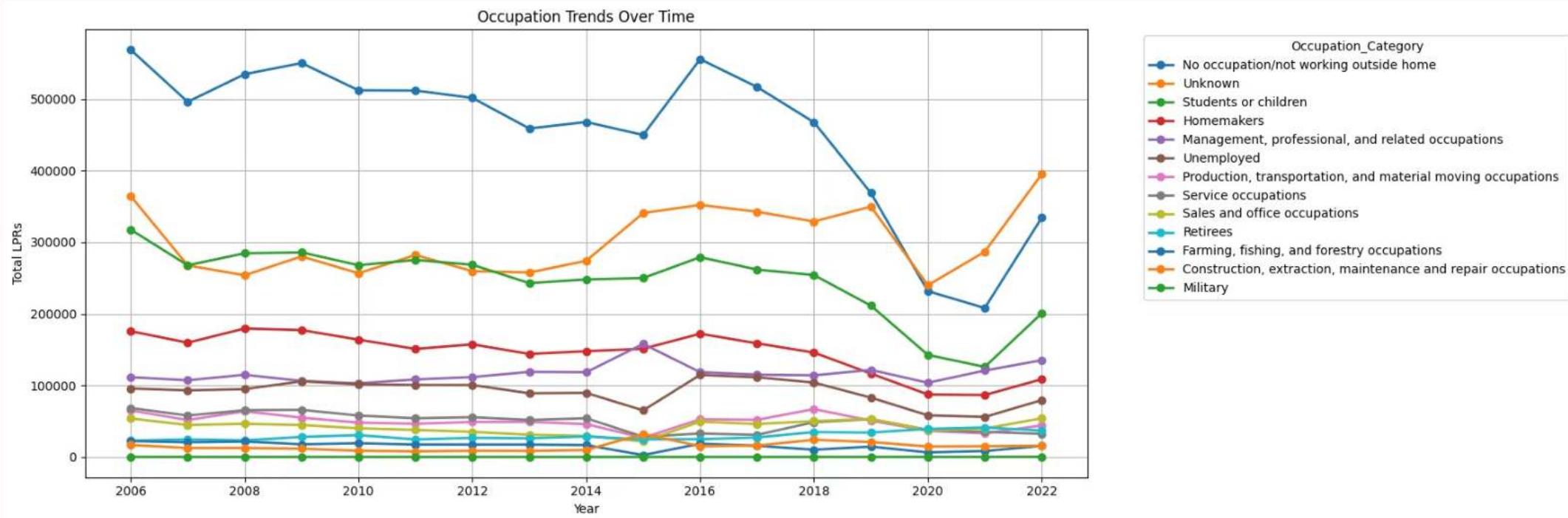
## After

Clean tabular format with 81,000+ rows

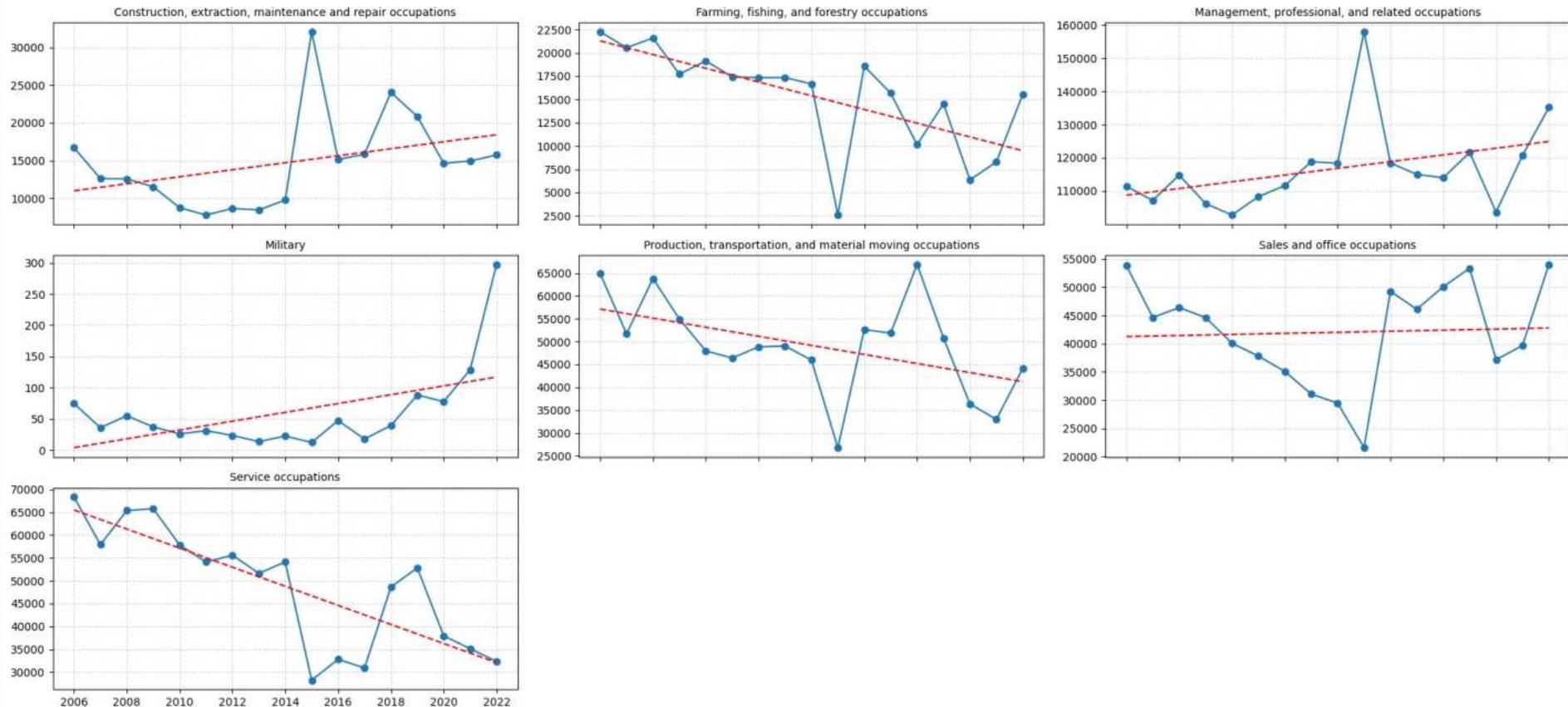
Consistent structure across 18 years

177 countries with complete data

# Occupation Trend Analysis



Occupation-wise LPR Trends Over Time



## 1 Construction

Slight decline with periodic spikes

## 2 Farming and Production

Constant downward trend

## 3 Management & Professional

Upward trend despite volatility

## 4 Service Occupations

Dramatic decline 2006-2022

## 5 Military

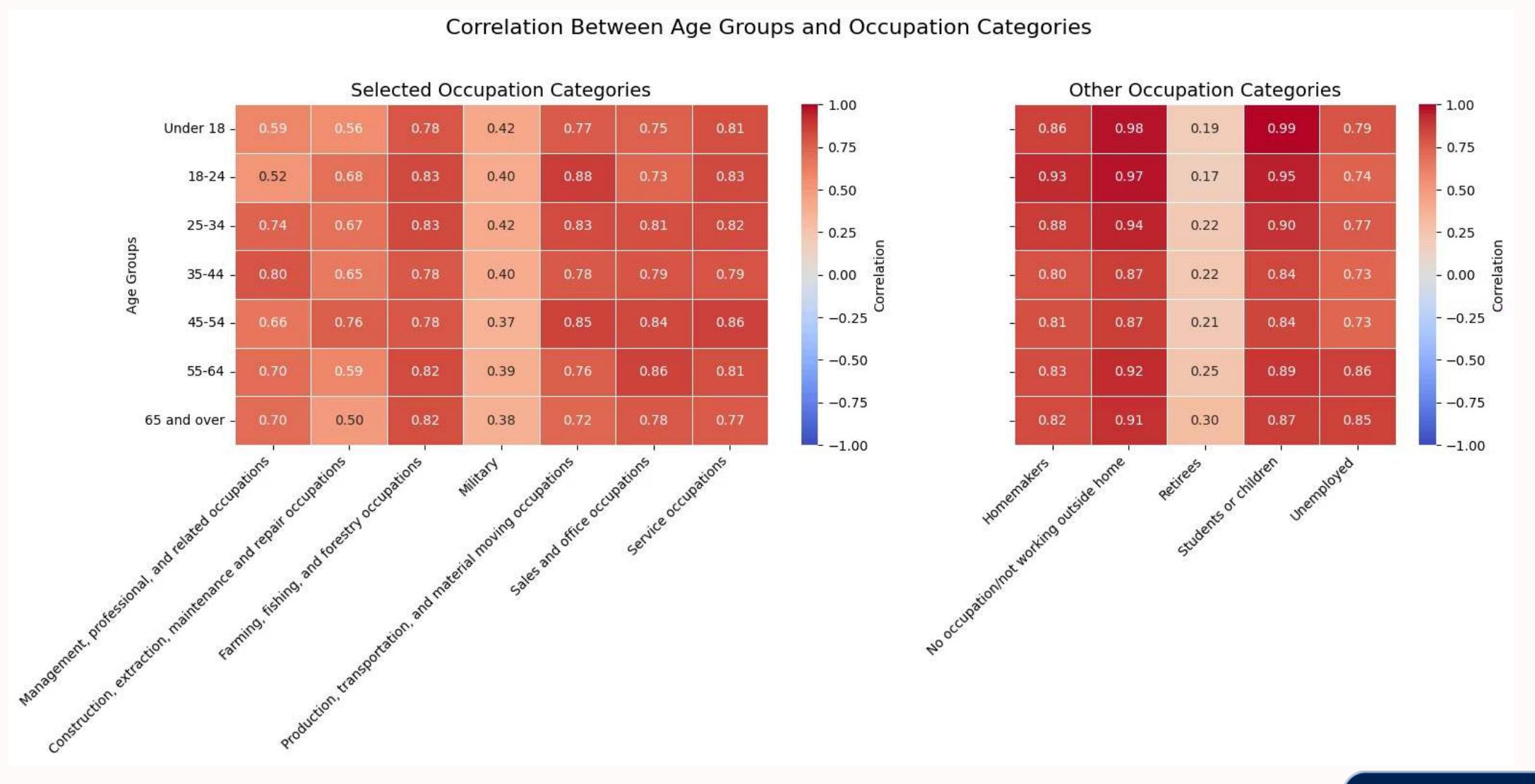
Growth seen all the years

## 6 All Categories

Significant year-to-year fluctuations

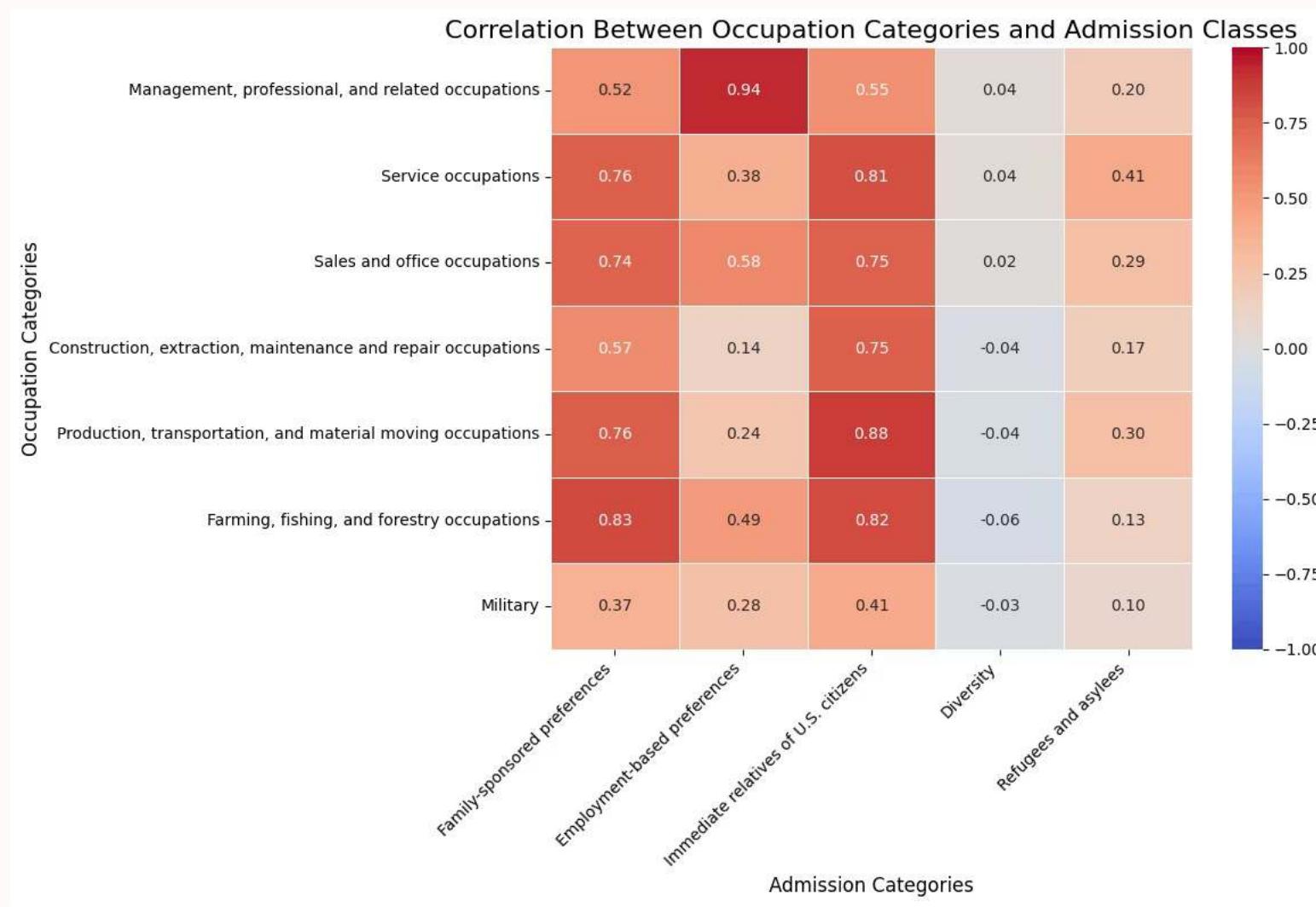
# Demographic Correlations

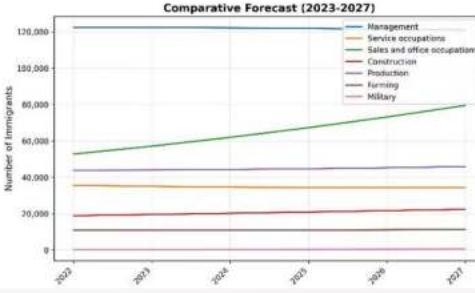
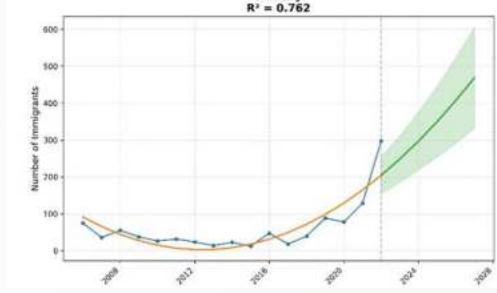
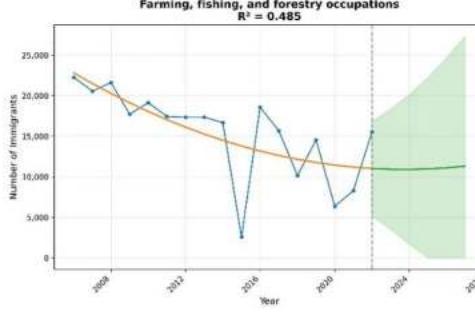
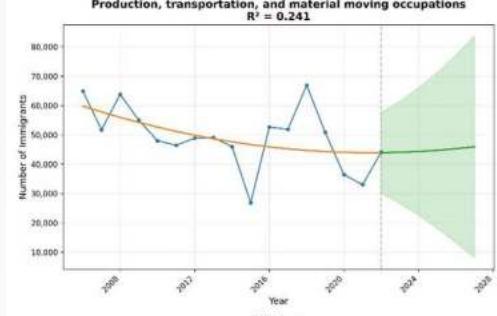
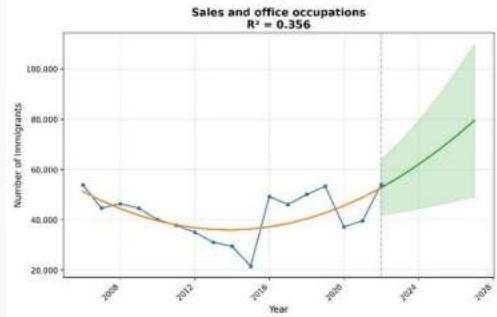
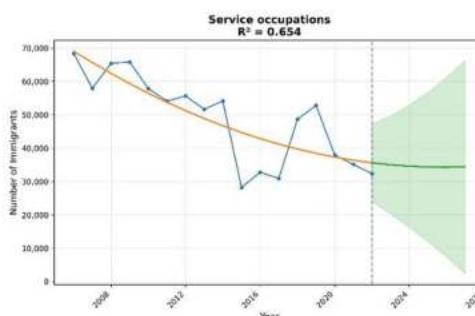
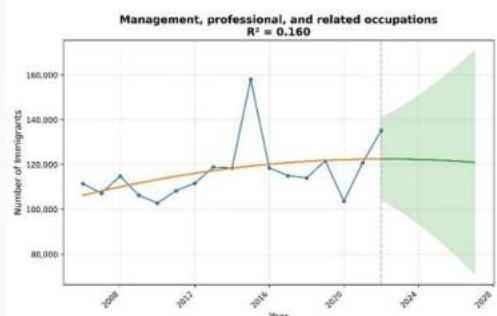
## Correlation Between Age Groups and Occupation Categories



# Demographic Correlations

## Correlation Between Occupation Categories and Admission Classes





# Future Projections

## Sales & Office

Strongest growth to 80,000 by 2027

## Management

Steady at 120,000 annually

## Service

Stabilizing at 35-40,000 annually

## Military

Tripling from recent lows