

Early-Stage Business Formation:

An Analysis of Applications for Employer Identification Numbers

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The views and opinions expressed herein are those of the authors do not reflect the views of the Census Bureau, the Federal Reserve Board, or Federal Reserve Bank of Atlanta. All results have been reviewed to ensure no confidential information is disclosed.

Motivation

- New measures of business initiation and formation based on applications for Employer Identification Numbers (EINs) through IRS form SS-4
- EINs: unique 9-digit numbers assigned by IRS to persons/entities for tax purposes
- Most EIN applications made for business-related purposes: start new business/pay taxes/establish payroll/hire employees/purchase businesses/change LFO...
 - **But many other non-business reasons:** estates, trusts, tax liens, retirement and health care plan administration, non-profit and gov. organizations, etc...
- EIN applications transmitted continuously on a weekly basis to Census Bureau
 - Contains valuable information on business intent and business characteristics (submitted on form SS4 mainly as answers to check-box questions)
 - ~42 million applications, current coverage: 2004q3-present (no access to early data)

Motivation

- Basic research questions on this data:
 - Can we distill useful information about early-stage entrepreneurial activity from EIN applications?
 - Are EIN applications correlated with national and local economic conditions?
 - Can they serve as economic indicators?
 - Can EIN applications and their characteristics be used to predict new employer business formation in a timely and geographically granular way?

Motivation

- Desirable features of the new business application and formation measures
 - Coverage
 - A large majority of business initiations + all employer business formations originating from them
 - Timely and forward looking
 - Up-to-date: recent quarters + projections into the future
 - For comparison: Annual info on new businesses in Business Dynamics Statistics: 2 year lag (latest data: 2014)
 - Fill the gap for the last two years, and also predict the next year/two years
 - Geographically granular
 - Nationwide, state, county, census tract, zip-code
 - High frequency
 - Quarterly (potentially monthly and weekly)
 - Public-use data for practitioners and policy makers (**planned for future**)
 - Business Formation Statistics (BFS)

Motivation

- Potential uses for policy makers, regional planners, and businesses
 - Follow local and economy-wide trends in business startups/entrepreneurship
 - Changes in business initiation/formation in response to economic conditions
 - Explore effects of policy on business formation
 - Local tax policy, policies aimed at attracting businesses: incubators, subsidies
 - Understand formation of new business clusters
 - Pool of potential entrants and entrepreneurial selection into agglomerations
 - Assess inequality in entrepreneurship across the geography
 - Causes and consequences of inequality at fine levels of geography (e.g. counties, census tracts)

Business Applications

- Filter all EIN applications to obtain core “**Business Applications**”
 - Exclude: *tax liens, non-profits, public entities, retirement/health plans, estates, trusts, mortgage pools; agricultural, certain financial, and private household businesses; missing geography, outside of 50 states and DC..*
[28% of applications, on avg. only 1.7% chance of turning into employer businesses, vs. 15%]
- Identify some important subsets of business applications:
 - High-Propensity Business Applications
 - Business Applications that have high probability of turning into businesses with payroll, based on application characteristics [30% chance]
 - Planned date for first wage payments/purchase business/change org. type/corporations/certain industries: mfg.,retail,health care,restaurants
 - Business Applications with Planned Wages (indicate a planned date for first wage payments) [43% chance]
 - Business Applications for a Corporation [33% chance]

All EIN Applications through IRS SS-4 Forms

Business Applications (BA)

High-Propensity Business Applications (HBA)

Business Applications with Planned Wages (WBA)

Applications for a Corporation (CBA)

Business Formations

- After an EIN application is made with business intent:
 - The entity may become an employer (job creator) at some point
 - When the first employee is hired/payroll tax paid, the EIN enters the administrative data for employer businesses (Business Register - BR)
 - Use the incidence and timing of first appearance of the EIN in the BR to identify employer “**Business Formation**” from an EIN application (find the first quarter with payroll for each EIN)
 - EIN applications from 2004q3 onwards are matched to payroll observations 2004q3-2014q4 in BR
 - Model the probability an application turns into an employer business
 - **Forward looking**: Does the EIN application turn into an employer business within the next 4 quarters? (**~75% of all business formations occur within 4Q of application**)

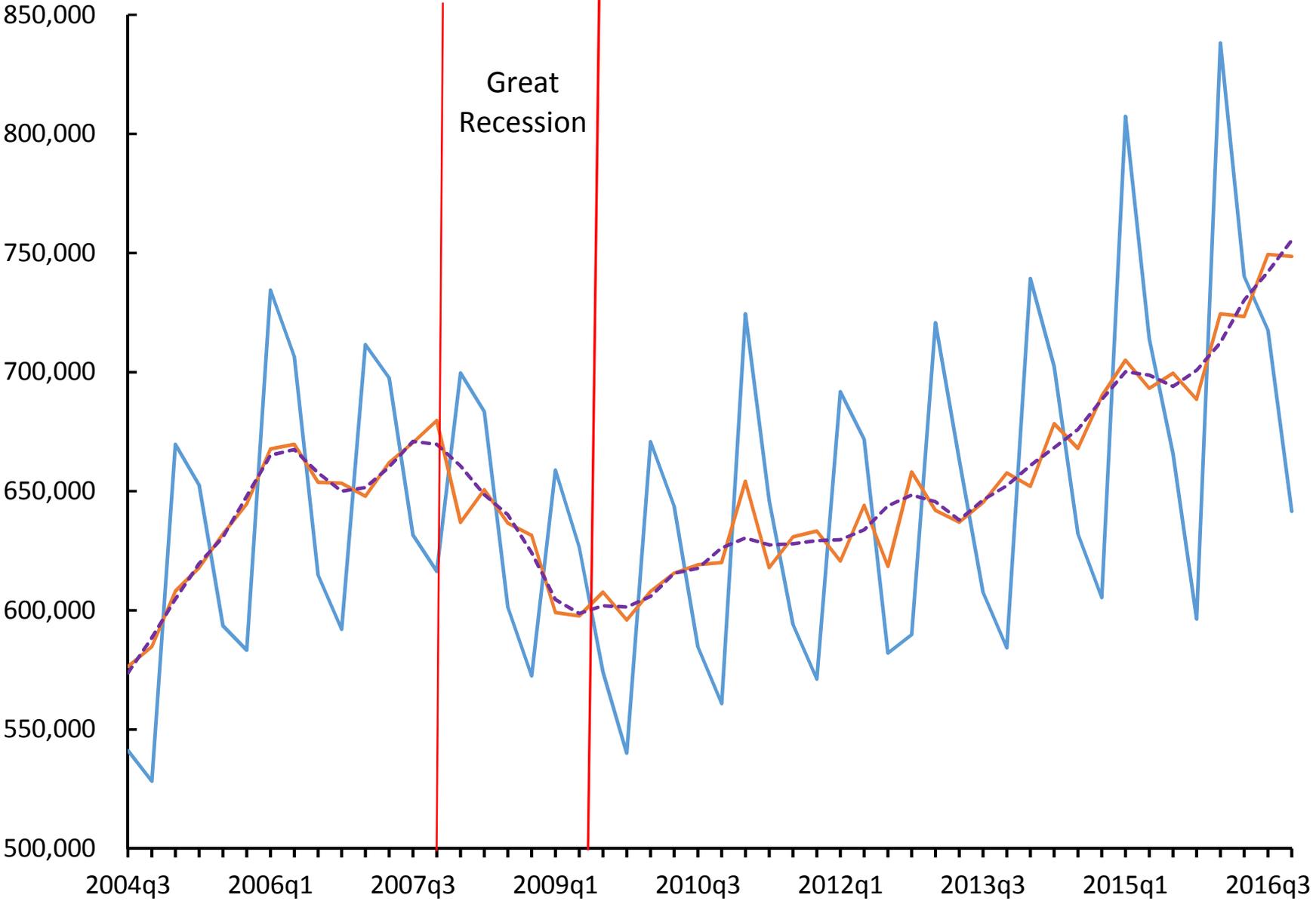
Modelling Business Formations

- $Y_{iq} \in \{0,1\}$: Indicator of whether EIN application i in quarter q turns into an employer business within the next 4 quarters
 - Only new employer businesses; **no** businesses formed by existing ones (e.g. Firm X opens a new subsidiary), business transfers, or non-employer businesses
- Model Y_{iq} as a function of application characteristics for the period 2011q1-2013q4 (a **Probit model**)
- Estimate **nationwide** (with state effects) and **state level** – coefficients vary by state
- **Application characteristics** explain a lot of the propensity to turn into an employer business / adding time-trends, other econ. indicators does not improve model fit
- Use the predicted probabilities to obtain the expected number of new business formations within the next 4 quarters (nationwide, state, county, census tract...)

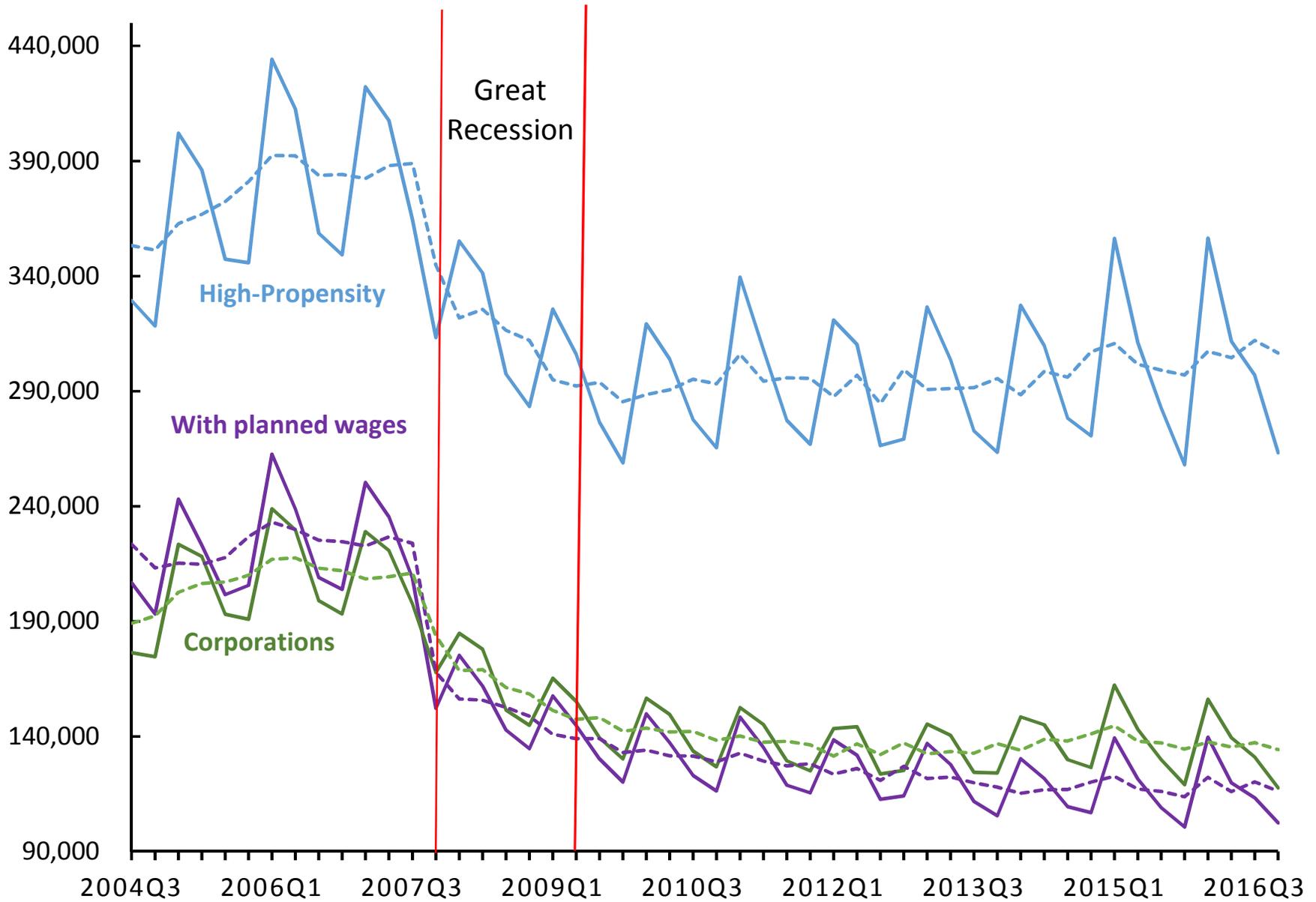
Application-Level Variables in the Model

- **Type of entity** (categories: sole-prop,partnership,corporation,etc.)
- **Reason for application** (categories: new business,hire employees,change organization type,banking purpose,etc.)
- **Presence of a planned first wages-paid date (indicator)**
- Industry (6-digit NAICS dummies)
- Application week dummy (within the year)
- Presence of a prior EIN (indicator)
- Presence of a trade name (indicator)
- Presence of an executor's name (indicator)
- Presence of a business address distinct from mailing address (indicator)
- Application for an LLC (indicator)
- Several interactions of the above

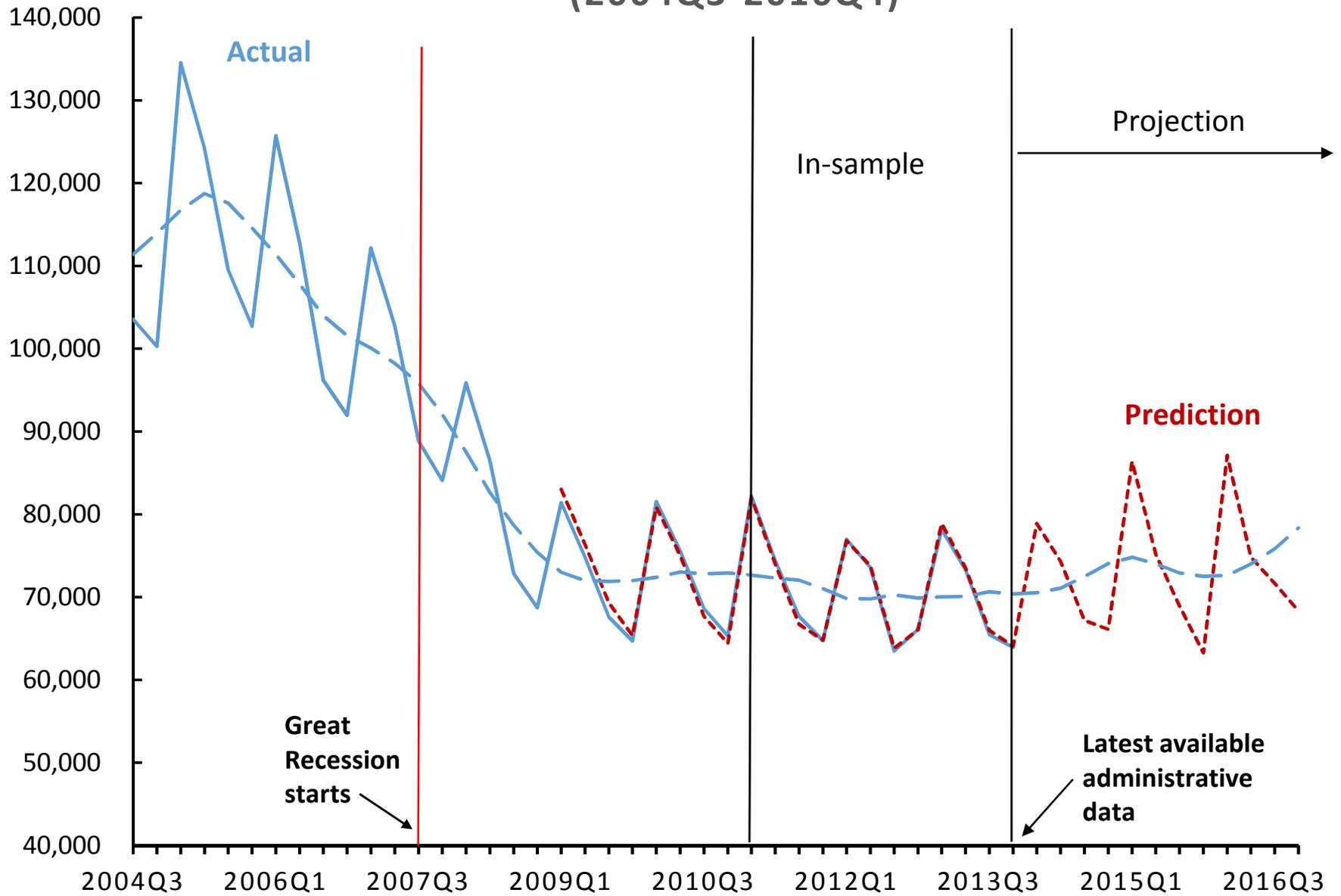
BUSINESS APPLICATIONS (2004Q3-2016Q4)



BUSINESS APPLICATIONS (2004Q3-2016Q4)

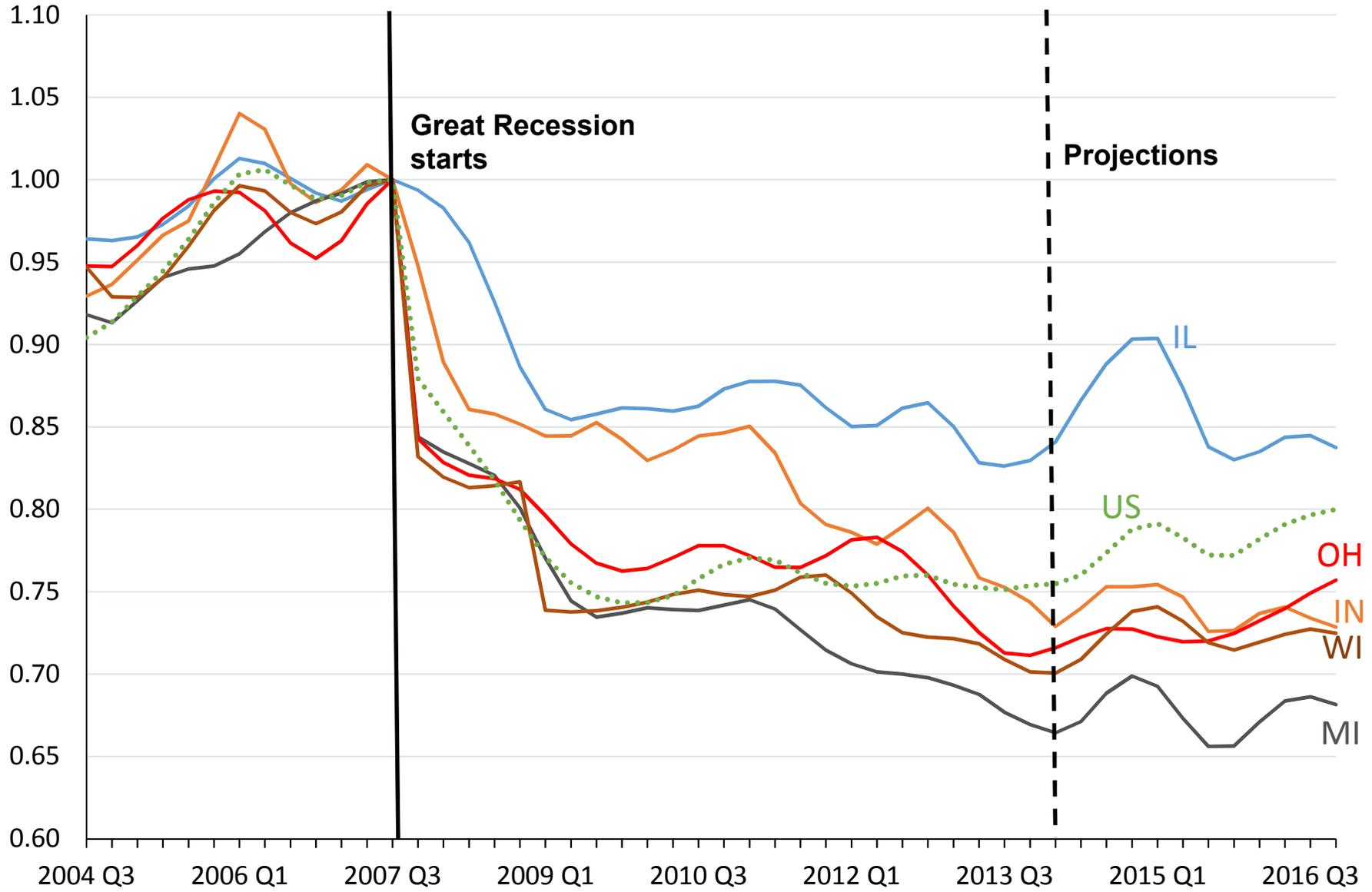


BUSINESS FORMATIONS WITHIN THE NEXT 4 QUARTERS, (2004Q3-2016Q4)



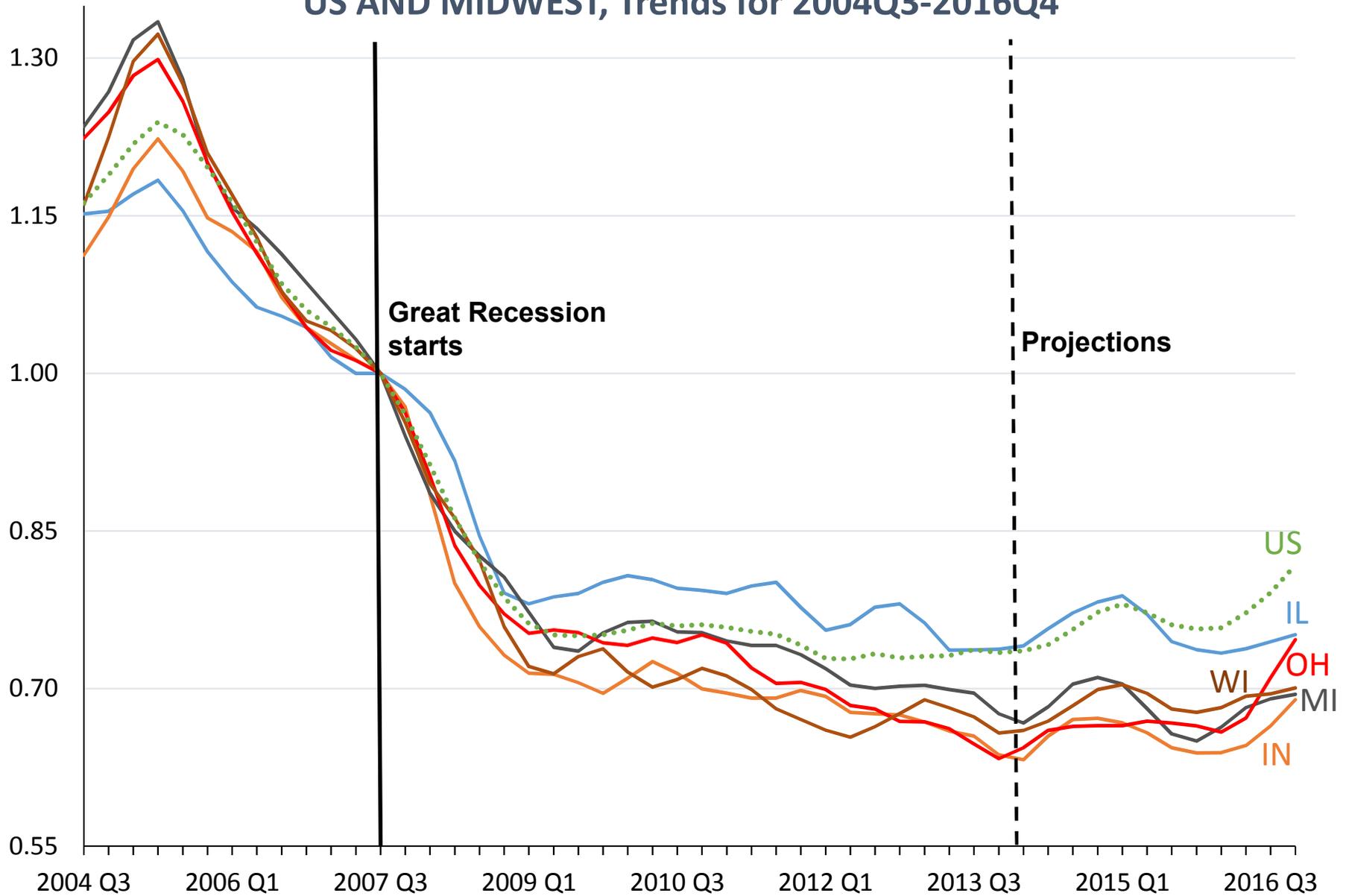
HIGH-PROPENSITY BUSINESS APPLICATIONS, US AND MIDWEST

Trends for 2004Q3-2016Q4



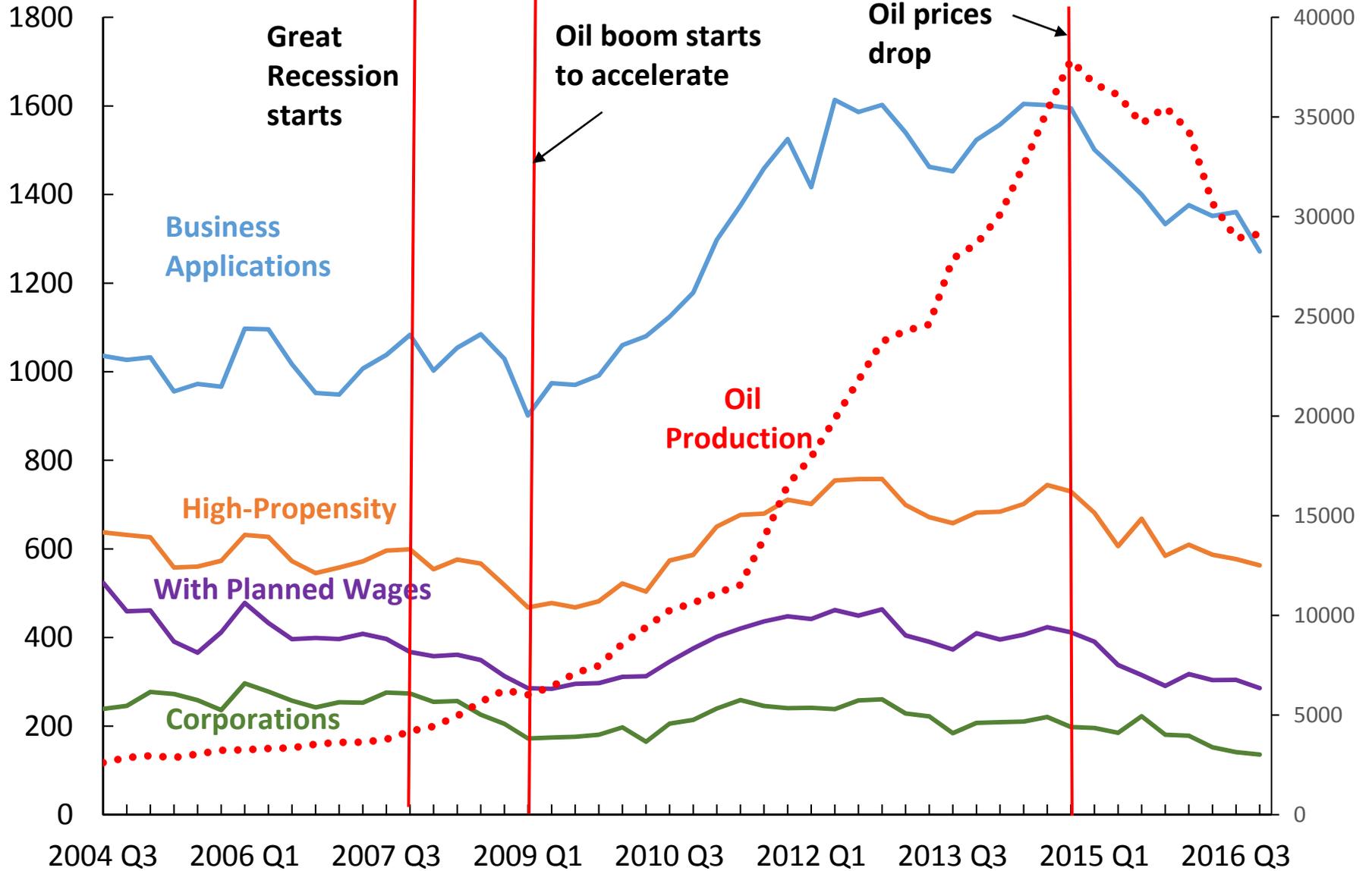
BUSINESS FORMATIONS WITHIN THE NEXT 4 QUARTERS

US AND MIDWEST, Trends for 2004Q3-2016Q4

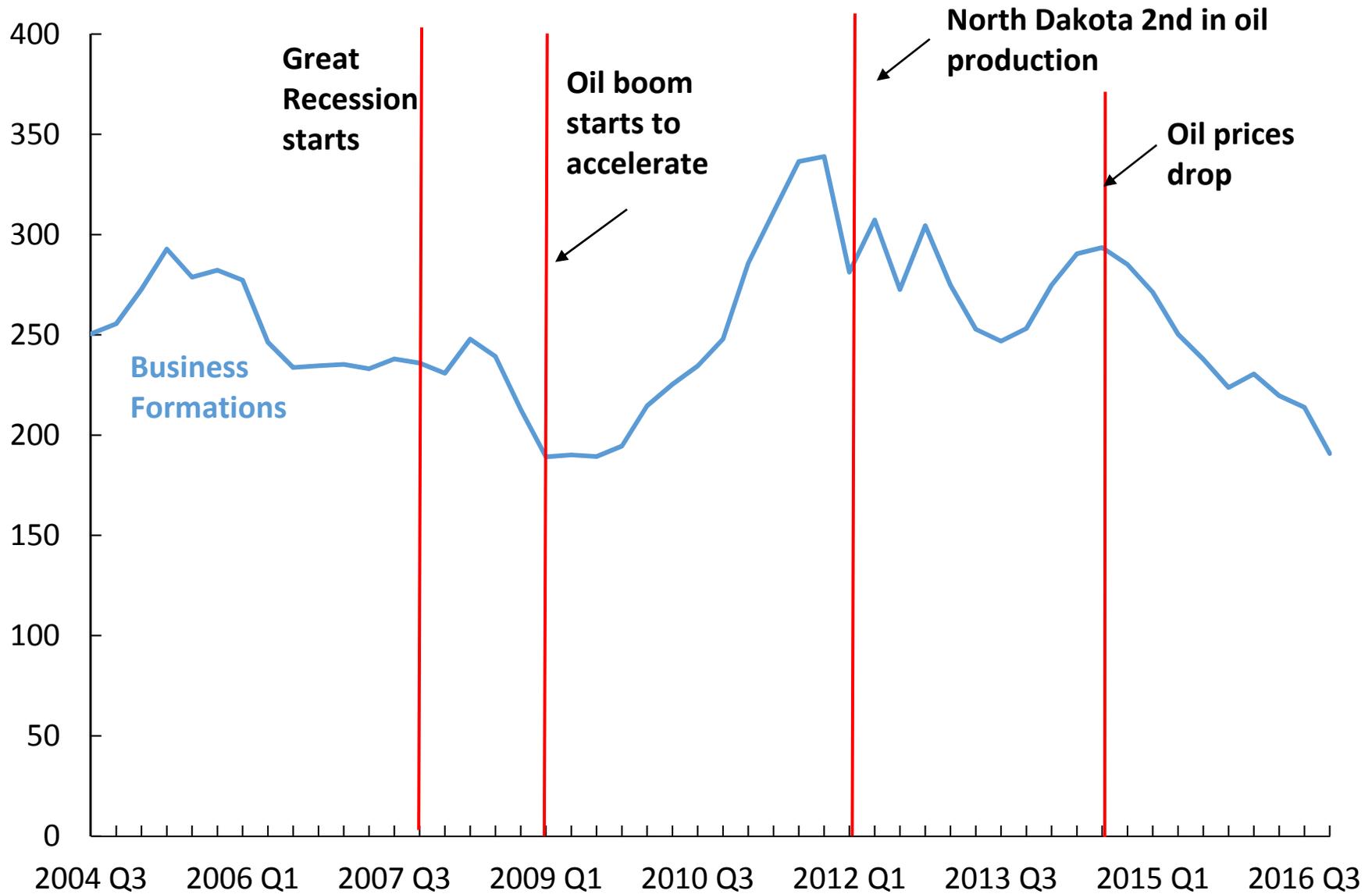


BUSINESS APPLICATIONS, NORTH DAKOTA (2004Q3-2016Q4)

Seasonally adjusted

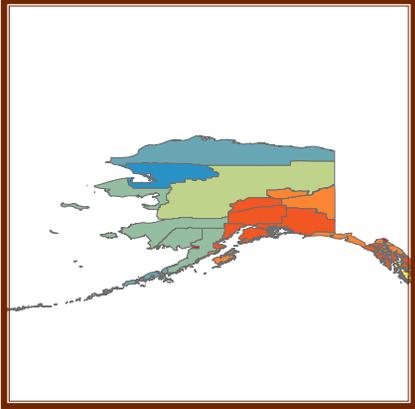


BUSINESS FORMATIONS WITHIN THE NEXT 4 QUARTERS NORTH DAKOTA (2004Q3-2016Q4) - Seasonally adjusted

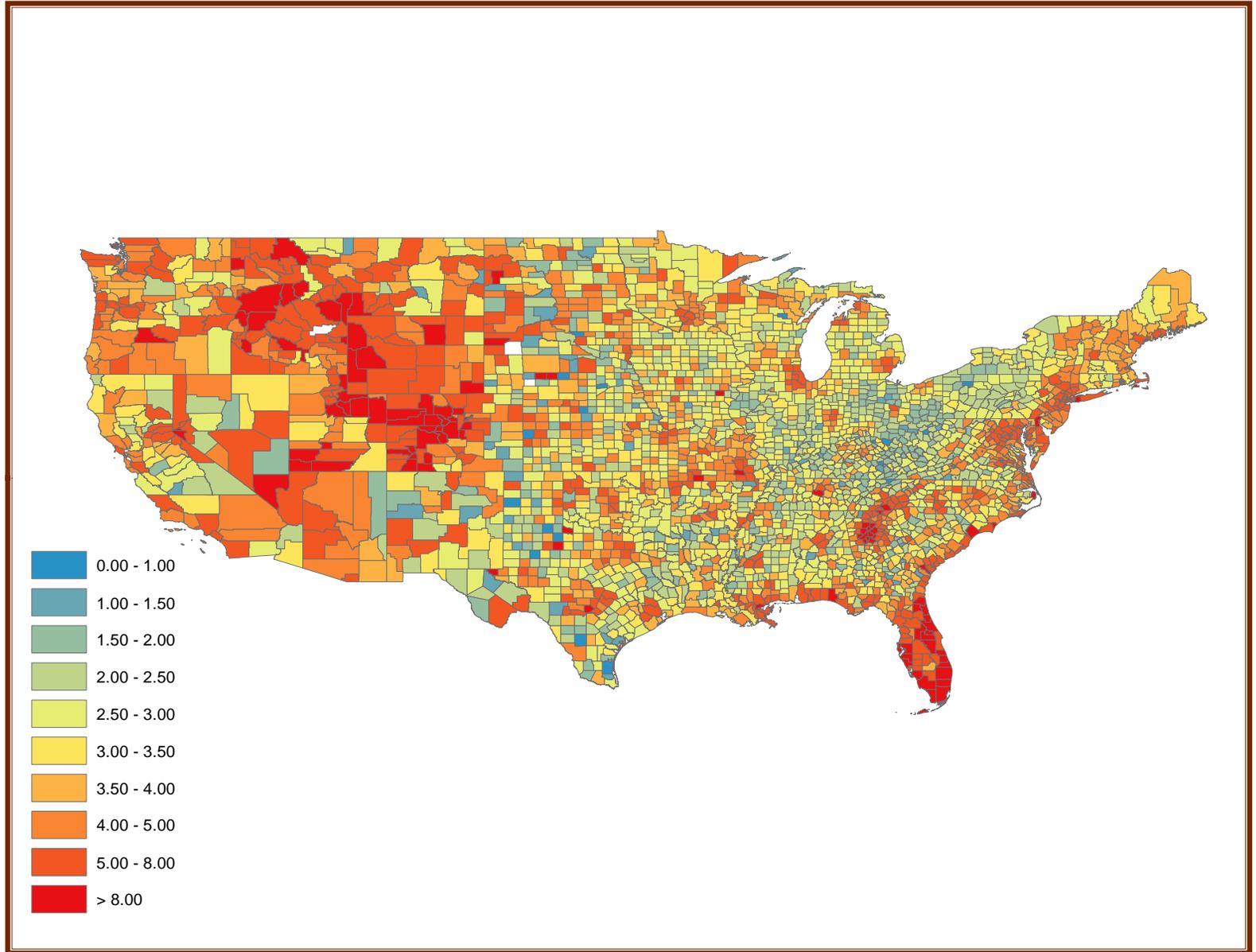
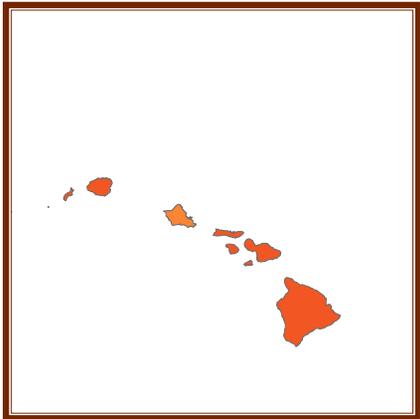


High-Propensity Business Applications per Capita by County (2006)

Alaska



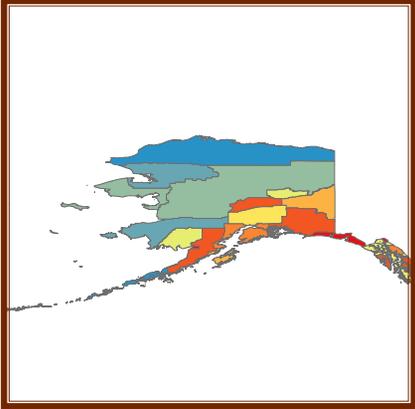
Hawaii



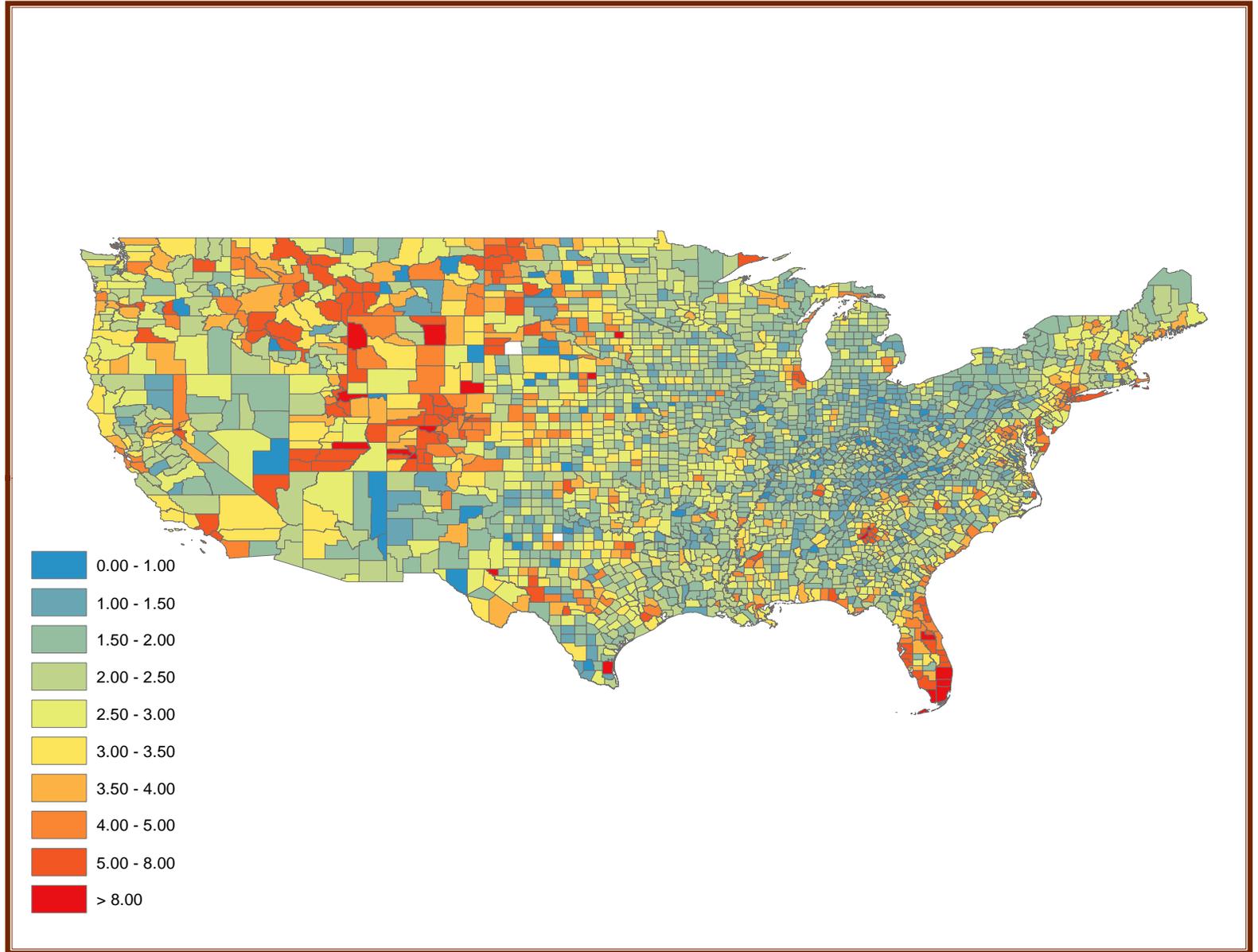
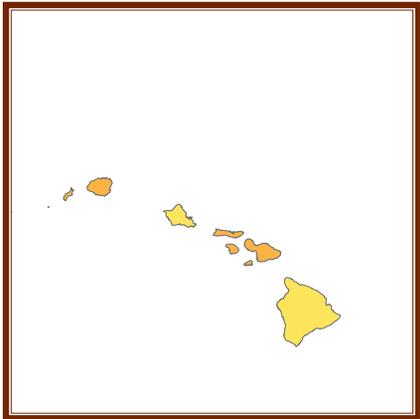
Note: Counties in white (blank) had no high-propensity business applications in 2006.

High-Propensity Business Applications per Capita by County (2015)

Alaska



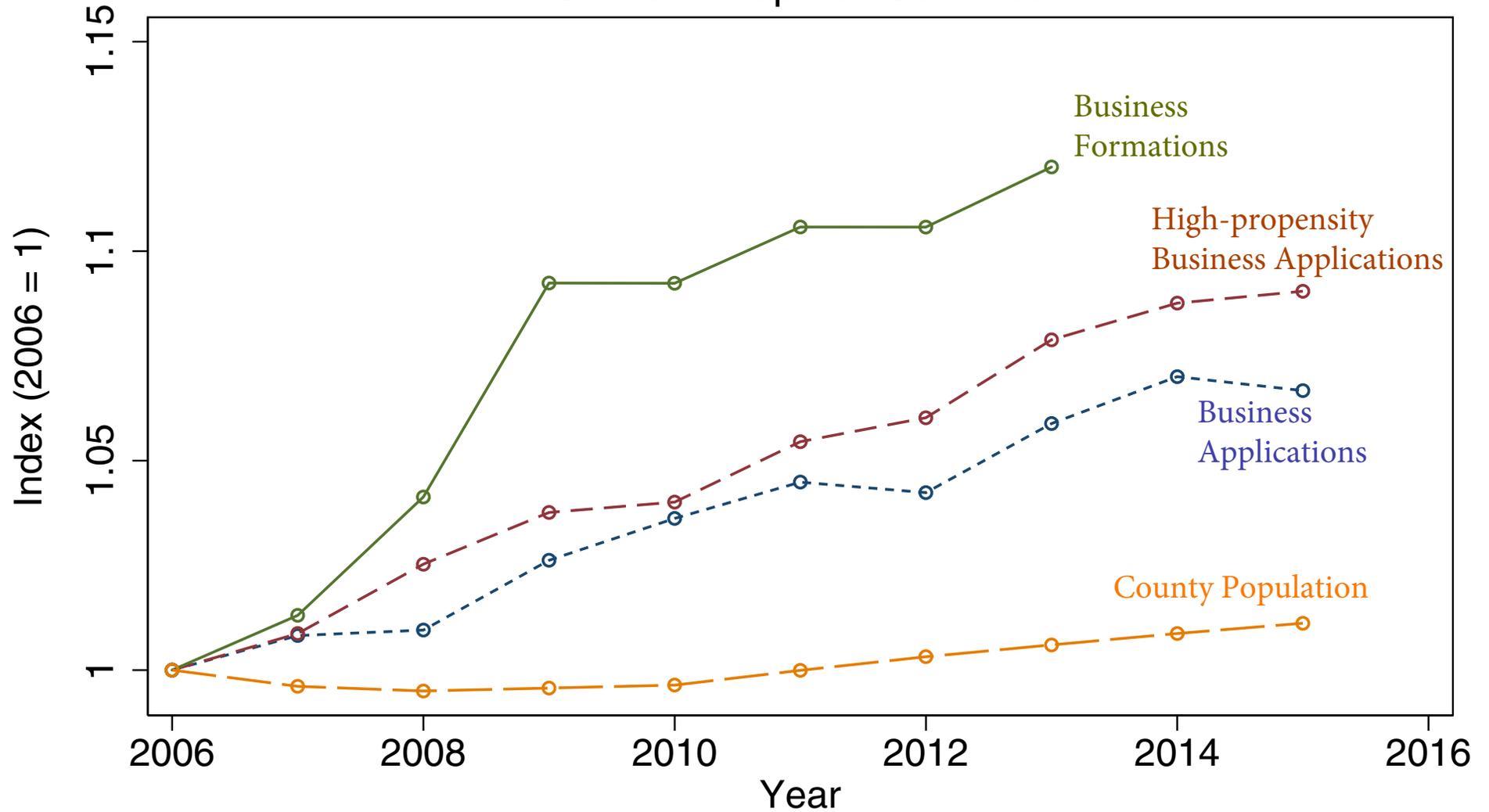
Hawaii



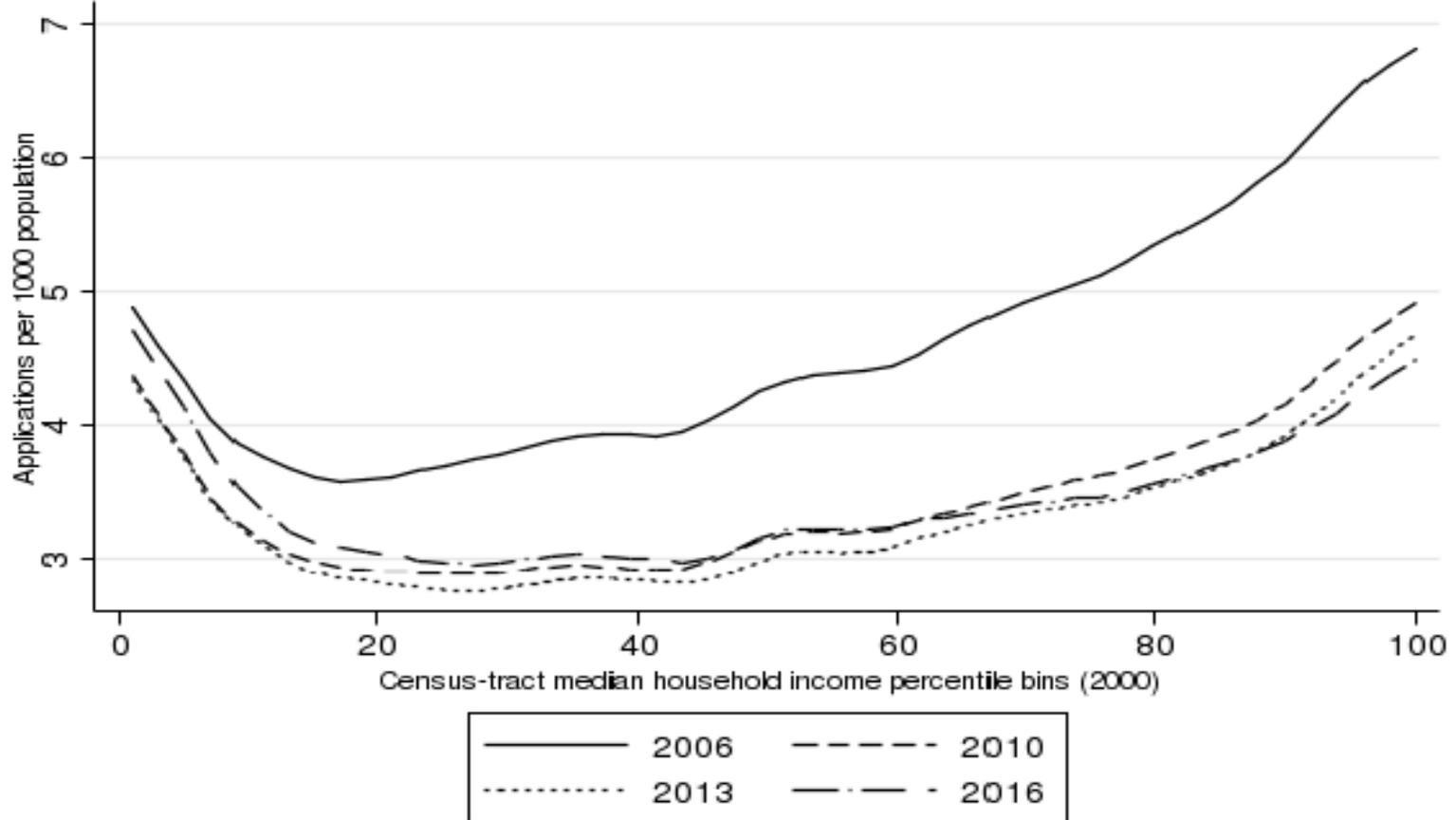
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Evolution of Inequality Measures

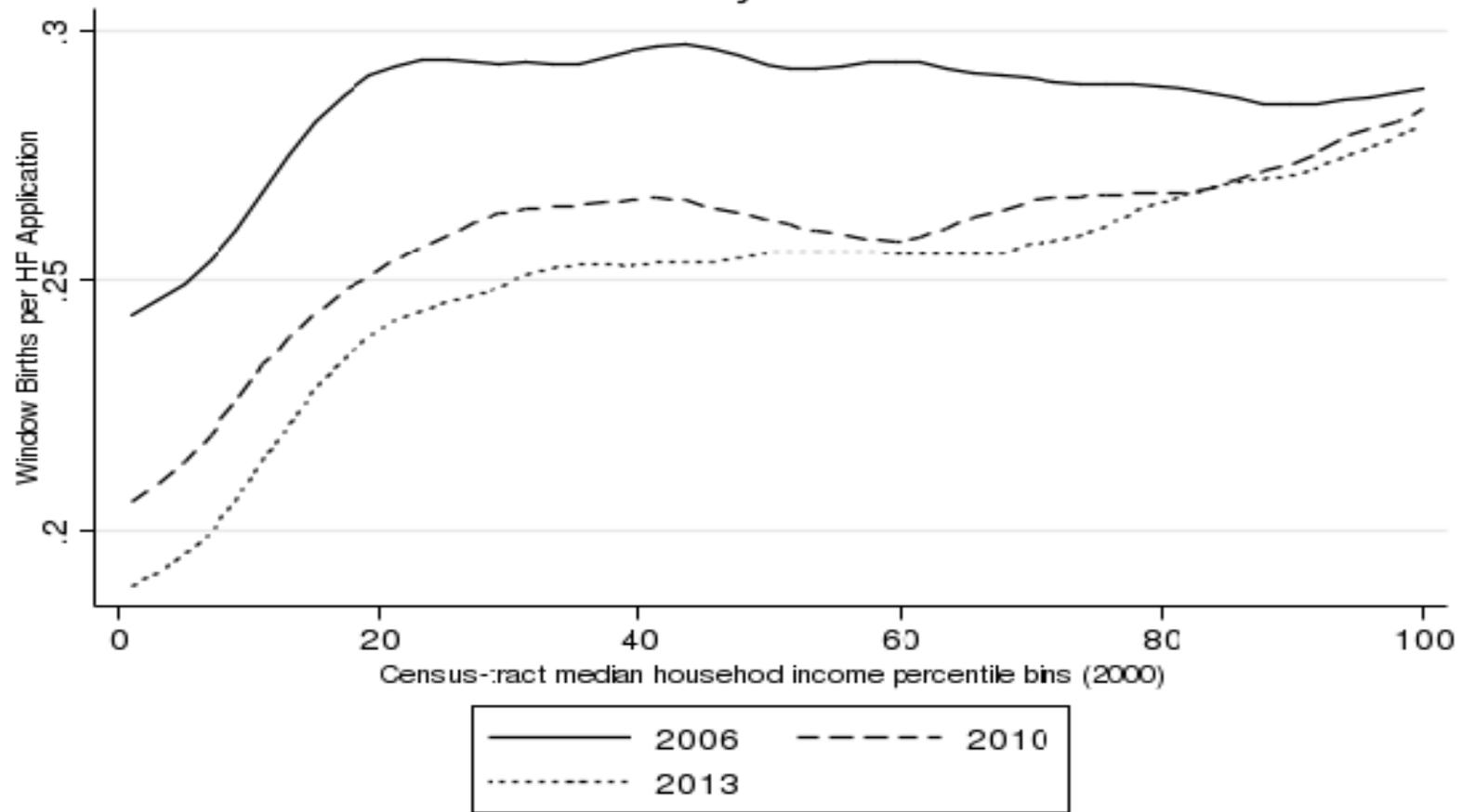
Share of Top 1% Counties



High Propensity Applications vs. Median Household Income



Business Formation Efficiency vs. Median Household Income



Initial Employment (formations in 2012 and 2013)

Application Characteristic	Avg. Employment at Startup Year	
Wage date	7.6	[vs. 5.3]
Corporation	6.9	[vs. 5.9]
Multi/Single-member LLC	9.5/6.9	[vs. 5.5]
High Propensity	7.0	[vs. 4.7]
Turns into an employer business within 4 quarters	7.2	[vs. 5.2]

Who Needs an EIN?

- Have/plan to hire employees
- Corporations and partnerships
- File tax returns for employment, excise, alcohol, tobacco, firearms
- Have a Keogh plan (retirement plan for self-employed/uninc.)
- Trusts, estates, non-profits, farmers' coops, plan administrators, real estate mortgage investment conduits
- Bankruptcies
- *Sole proprietorships* may use SSN: Still EIN has its advantages.