

The impact of manufacturing credentials on earnings and the probability of employment

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Industry credentials

- What they're not
 - Licenses from state government agencies
 - Certificates from a community college (although some CCs coordinate with industry organizations on approved training)
 - A degree
- What they are
 - Formal recognition of training (or demonstration of skill) from an industry association or standards organization (e.g., in manufacturing or health care)
 - Training provided by an entity, sometimes accredited by the organization (sometimes a CC)
 - Attainment achieved via a test or demonstration
 - Sometimes time-limited, often tiered/tied to other credentials from the same org

Project background

- Partners
 - U.S. Census Bureau
 - National Association of Manufacturers and the Manufacturing Institute (NAM)
 - National Student Clearinghouse (NSC)
- Pilot involving data sharing between NAM-NSC, and then Census
 - Linking select manufacturing credentials data to NSC post-secondary education data
 - Linking NSC and credential data to demographic and labor force data held at the U.S. Census Bureau
- Combined data provides opportunities to understand:
 - the intersection of industry credentials with traditional education programs and pathways
 - the employment patterns and earnings trajectory of industry credential-holders versus comparable non-credentialed workers

Data

- Credential earners from third-party providers were matched to their NSC post-secondary data
 - Credential data from four organizations
 - Credential data coverage: 2005 to 2018
 - NSC post-secondary data: late 1960s to 2018
- NSC-credential data linked to data at Census Bureau
 - Demographic data from various Title 13 sources (ACS, decennial Census, etc.)
 - IRS earnings and employer data (Form W2, Form 1040, Business Register)
 - Comparison group developed from ACS samples (all ACS workers 18-64 in 2016, 2017, and 2018 linked to W2 from 2014-2018)
 - Individuals without credentials but otherwise similar to credentialled group

Methods

- Summary comparisons within the credentialed group to uncover patterns of credential attainment by demographic group/industry
- Coarsened exact matching to an ACS comparison group (using cem command in Stata)
 - Takes the idea of an exact match (X) but bins categories to reduce the number of cells (X^*)
 - Allows the user to predefine categories (or bins) on which exact matches must be made (e.g., industry categories)
 - Prunes both treatment and control units (so results are interpretable as a treatment effect on the matched subsample)
- Regression analysis proceeds on processed data (outcomes are earnings and 0/1 employment)

Summary Results

- Focus on the timing of the last credential earned
 - May only be separated by three months
 - Getting as close as we can to labor-market entry post-credential
- Earnings trajectories by manufacturing credential and work in a manufacturing industry
- Subgroup analysis of student outcomes by age group, race, gender, industry of employment, and educational degree
- Only presenting a small subset of results in the interest of time

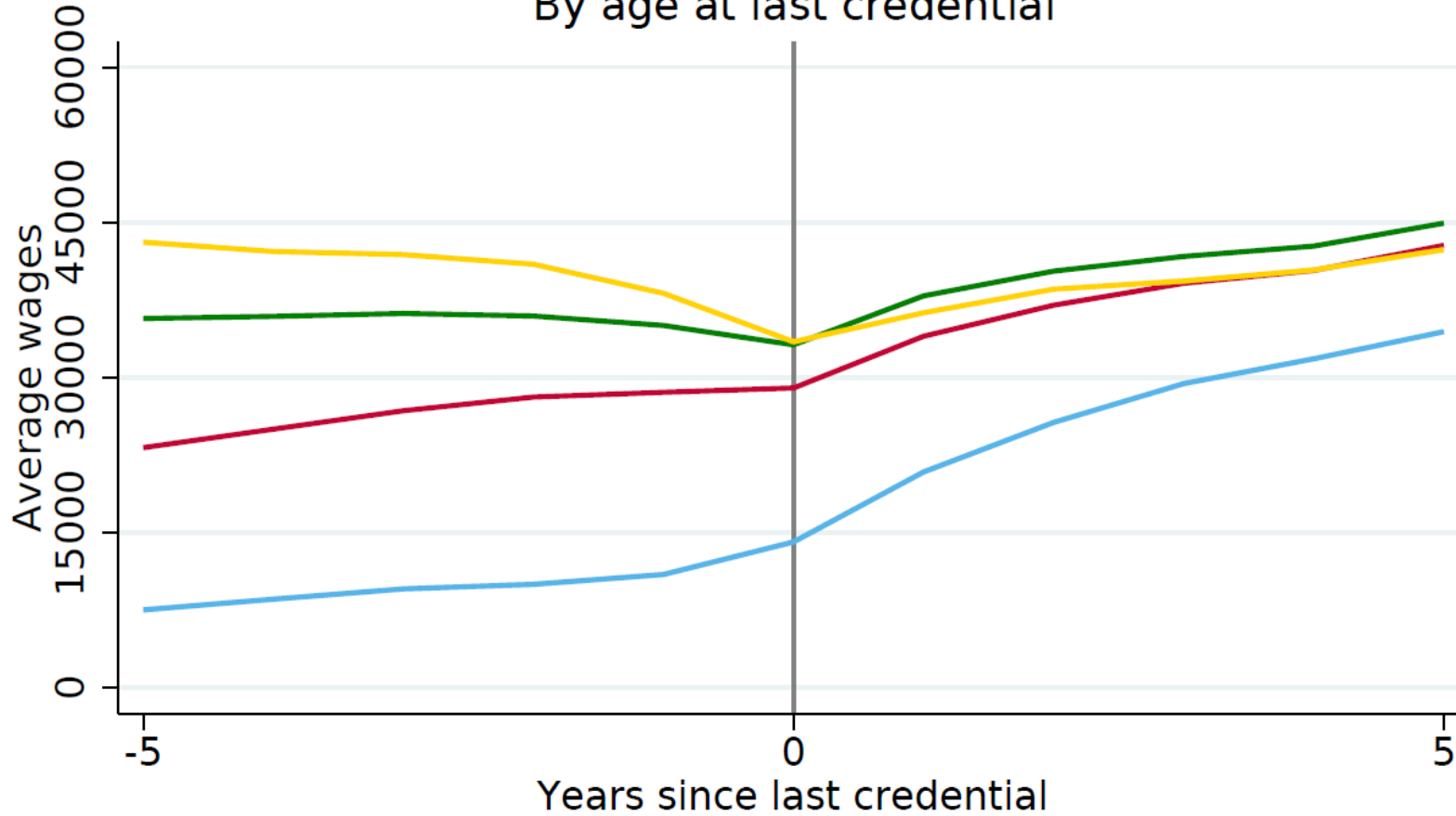
Match rates and observation count

Match rates of project data to unique identifier, demographic data, and federal tax information	
PIK rate on full NSC-NAM data transfer	0.5766
PIK rate on manufacturing credential records	0.5628
Fraction unique manufacturing learner IDs assigned PIK	0.5433
Percent of PIKed manufacturing cred students linked to ACS/Decennial	0.8203
Percent of PIKed manufacturing cred students ever linked to W2	0.8281
Percent of PIKed manufacturing cred students ever linked to 1040	0.8767

Source: NAM-NSC, decennial 2010, and 2005-2018 ACS, Form 1040, and Form W-2 data. Approved for release under CBDRB-FY2021-CES010-029.

Average wages since last credential

By age at last credential

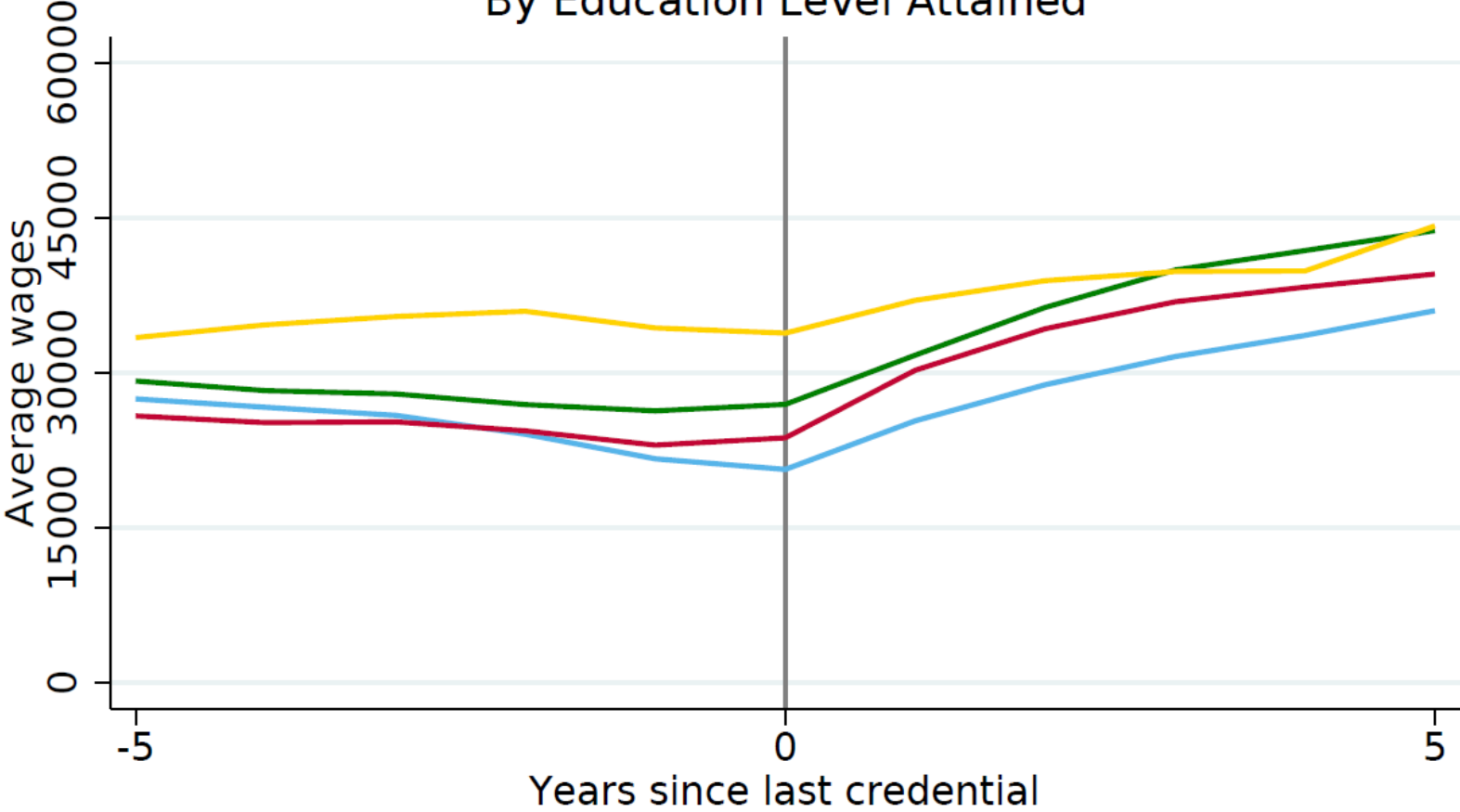


Age 18-25 Age 26-35
Age 36-45 Age 46-60

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Average Earnings Since Last Credential

By Education Level Attained

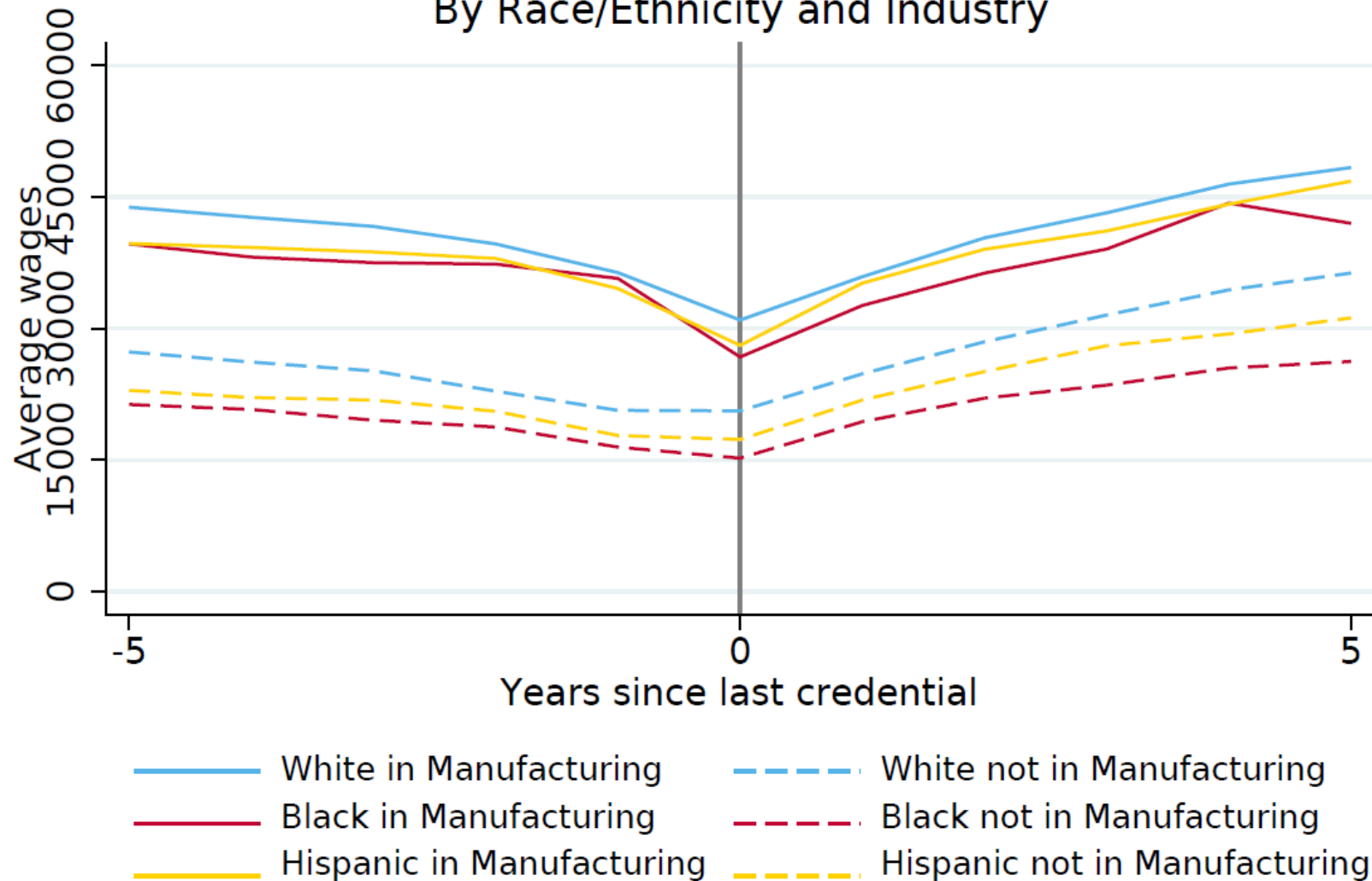


— Credential — CC Certificate
— CC Associates — Bachelors

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Average wages since last manufacturing credential

By Race/Ethnicity and Industry

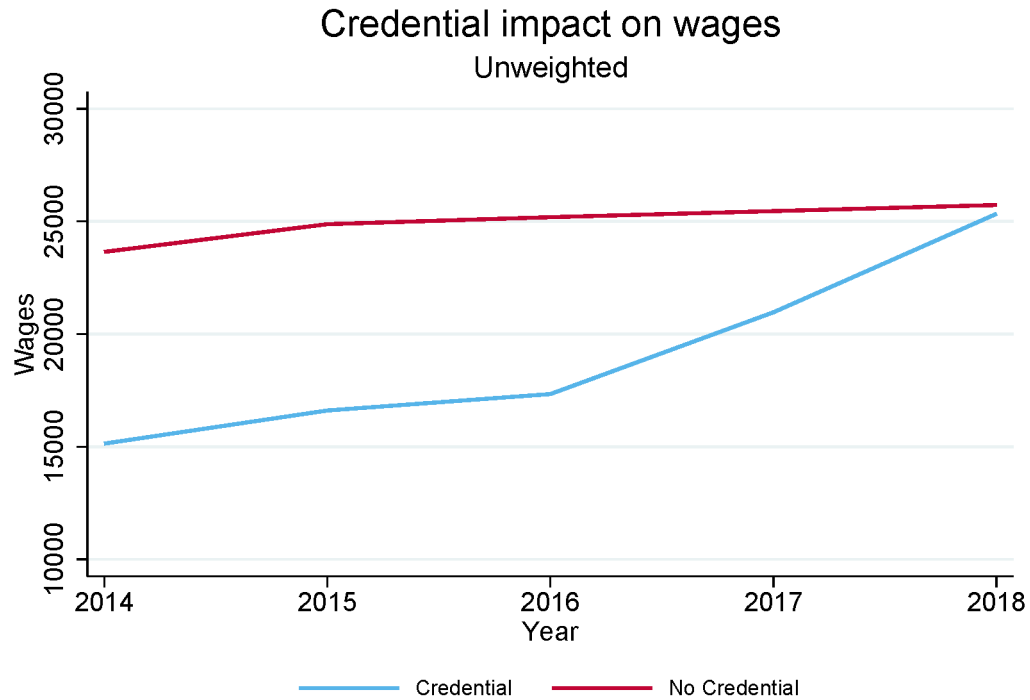


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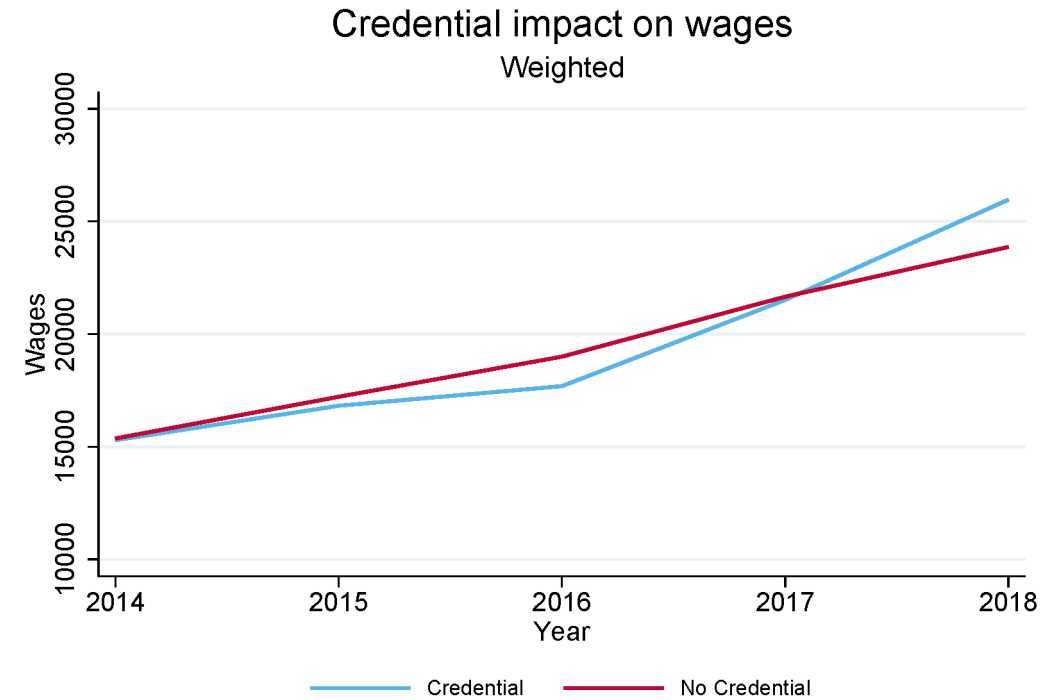
CEM results

- Three samples: all workers, associate's or less, and a pre/post group isolated to those attaining first cred in 2016/2017
- Earnings/employment measured in 2018
- Matches made on X^* ; same controls used in post-match regressions
- X^* includes: age, age squared, race/ethnicity, gender, education (4 categories or associates/no associates), industry (5 categories), family structure (married/children), employed in 2014, 5 bins of first-period earnings, employer 2017 payroll
- Bins were chosen to balance match with the retention of project obs. In the rebalance, we retain between 95% and 98%.

Pre-earnings control check



CBDRB-FY21-CES014-035



CBDRB-FY21-CES014-035

Earnings

	Full matched sample	Associates degree sample	Assoc. and post 2017
Has a credential	-1,165*** (88.46)	1,468*** (83.68)	1,993*** (128.3)
Observations	6,410,000	4,140,000	3,138,000
R-squared	0.3956	0.3775	0.2509

Source: NAM-NSC, decennial 2010, and 2005-2018 ACS, Form 1040, and Form W-2 data. Approved for release under CBDRB-FY2022-CES010-001.

Employment

	Full matched sample	Associates degree sample	Assoc. and post 2017
Has a credential	0.006** (0.001)	0.007*** (0.001)	0.013*** (0.002)
Observations	6,410,000	4,140,000	3,138,000
R-squared	0.4066	0.4048	0.3658

Source: NAM-NSC, decennial 2010, and 2005-2018 ACS, Form 1040, and Form W-2 data. Approved for release under CBDRB-FY2022-CES010-001.

Summary conclusions

- Workers with credentials have better employment outcomes than comparable workers without credentials
 - Results hold for earnings when restricting to the group with an associate's degree or less (since a BA/BS is a rarer event among project obs)
 - Results are stronger when we limit comparison to a per/post setting
- More credentials equals better outcomes, conditional on any credential
- Earnings continue to improve for credential holders as much as 5 years from the last credential attainment; older workers recoup declining earnings
- Credential attainment may level playing field somewhat between white workers and historically disadvantaged workers

Lessons Learned (to date)

- The universe of credentialing entities is large and varied
- The nature and types of credentials is constantly evolving
- Additional research needs to occur on harmonization and categorization of credentials
- Increasingly credentials are a key component of the educational process (alone or in combination with traditional credentials, such as a college degree)
- Generation of regular data releases will require the production of numerous statistics and flexibility in reporting

Thank you!

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