

# Aspen Underwood

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## Education

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<b>Doctorate of Philosophy in Economics</b> Clemson University Fields: Industrial Organization, Environmental Economics, and Financial Economics Committee: Babur De los Santos, Matthew Lewis, Andrew Hanssen, Jorge Garcia	May 2022 Clemson, SC
<b>Master of Arts in Economics</b> Clemson University	December 2021 Clemson, SC
<b>Bachelor of Science in Business Administration in Economics</b> <b>Bachelor of Art in Music</b> Colorado State University Pueblo	May 2016 May 2016 Pueblo, CO

## Professional/Research Experience

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<b>Clemson University</b> NBER Pre-Doctoral Fellow on Energy Economics	July 2020-Present Clemson, SC
<ul style="list-style-type: none"><li>• Utilize transaction-level electric vehicle charging data to assess the effects of electric vehicle subsidies and price on electric vehicle charging using difference in difference, synthetic control, and discrete choice demand estimation using R, Python, and the Palmetto Supercomputing Cluster.</li><li>• Performed counterfactual analysis on the benefits of electric vehicle subsidy programs.</li><li>• Used machine learning techniques in Python to explore potential pre-treatment station selection bias.</li><li>• Estimated charging station elasticity and the role of charging station characteristics on demand</li><li>• Explore the role of spatial competition in driver charging behavior for electric vehicle charging stations when charging prices changed.</li><li>• Compiled unique data set of California electric vehicle subsidy programs</li></ul>	
<b>Clemson University</b> Graduate Research Assistant	August 2016-July 2019 Clemson, SC
<ul style="list-style-type: none"><li>• Collected, merged, and cleaned data for professor's research on election contributions using Python</li><li>• Compiled historical immigration data for professor's economic research project and performed literature reviews</li><li>• Compiled and cleaned IMDB data on actors and films for professor's research</li><li>• Programed code in parallel to determine billions of combinations of sports players that meet specified criteria for fellow student's research</li></ul>	
<b>U.S. International Trade Commission(USITC)</b> Economics Intern	May-August 2018 Washington DC
<ul style="list-style-type: none"><li>• Worked with trade, non-tariff data, and gravity data in Python; helped develop an approach to estimate the average treatment effect of non-tariff measures on trade flows</li><li>• Utilized R to create a single variable for the European Union in USITC gravity data set <a href="https://www.usitc.gov/data/gravity/description.htm">https://www.usitc.gov/data/gravity/description.htm</a></li><li>• Reviewed infrastructure literature, found data to help measure infrastructure development for USITC gravity data set, and organized the data using both R and Python.</li><li>• Researched regional trade agreements for USITC gravity dataset.</li></ul>	

**Healy Center for Economic Research**  
Healy Fellow

January 2013- May 2016  
Pueblo, CO

- Analyzed aspects of the economic situation in the local community for the purpose of economic development.
- Assisted with projects to promote growth of the local economy.
- Coordinated an economic impact study of the CSU-Pueblo sports program. Worked as a part of a team with two other students to write a survey, collected and compiled data from local businesses, and wrote a report for the Pueblo Urban Renewal Authority.
- Individually conducted a needs assessment of a Doctorate of Nursing program
- Compiled data and helped prepare a presentation for the Pueblo Economic Forum given by a CSU-Pueblo professor.

## Teaching Experience

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**Clemson University**

August 2019- May 2020

Graduate Instructor of Record for 'Principles of Macroeconomics' (Econ 2120) and 'Principles of Microeconomics' (Econ 2110) Clemson, SC

- Develop and deliver lectures for up to 100 students multiple times each week
- Create and grade assessments such as quizzes and examinations
- Establish lesson plans using technological resources to provide instruction in the ever-changing educational environment

**Clemson University**

August 2017- May 2019

Teaching Assistant

Clemson, SC

- Acted as TA for 'Principles of Microeconomics' (Econ 2011) and 'Principles of Microeconomics' (Econ 2012). Lectured once a week, authored quizzes, graded exams, and answered undergraduate economics students' questions.

## Technical Skills

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**Languages:** Python(Proficient), R(Proficient)

**Statistical Packages:** MATLAB, EViews, mlogit(R), scikit-learn(Python), Matplotlib(Python)

**Tools/Framework:** L<sup>A</sup>T<sub>E</sub>X, Palmetto Supercomputing Cluster, ArcGis, Microsoft Office, Linux(Basic)

## Awards and Fellowships

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**NBER Pre-Doctoral Fellowship on Energy Economics** 2020-2022

**3rd Year Paper Award, Clemson University** 2020

**Graduate Assistant, Clemson University** 2016-2020

**Outstanding Economics Student Award, Colorado State University Pueblo** 2015

**Healy Fellowship Recipient, Healy Center for Economic Research** 2013-2016

## Research Presentations

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**Camp Resources XXVII**

2021

"Plugging Into Driver Preferences: How Charging Station Prices and Characteristics Affect Electric Vehicle Driver Charging Decisions"

Asheville, NC

**Clemson University Industrial Organization Workshop**

2018-2021

Presented Each Semester on Current Research

Clemson, SC

**Southern Economic Association**

2020

"Are We There Yet? Understanding How Charging Station Prices and Characteristics Affect Electric Vehicle Drivers"

New Orleans, LA

**Southern Economic Association**

2018

"Does the Presence of Indian Reservations Decrease Oil and Natural Gas Drilling?"

Washington DC

## Working Papers

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- “Plugging Into Driver Preferences: How Charging Station Prices and Characteristics Affect Electric Vehicle Driver Charging Decisions” (**Job Market Paper**)

Abstract: Vehicle manufacturers and governments across the U.S. employ various subsidies to promote the adoption of electric vehicles (EVs). These subsidies develop networks of EV charging stations and subsidize the price consumers pay for charging. However, doing so sensibly is hampered by a poor understanding of EV drivers’ demand for stations and charging. Using charging-session level data from the Evergy charging network in Kansas City, at a time when there was a discrete end to a charging price subsidy, I empirically analyze drivers’ charging behavior. I find driver charging decreased 55% the type of business near a station, play an important role in driver demand for stations. Counterfactual analysis indicates the charging price subsidy provided \$0.81 in value to drivers for every dollar spent on the subsidy and stations vary significantly in the value they provide to drivers. These findings suggest the need to account for the effects of station characteristics and charging price in future EV subsidy programs.

- “Does Electric Vehicle Station Density Affect Usage?”

Abstract: The growth in electric vehicle (EV) adoption over the last decade has increased the need for EV charging stations. However, existing research on optimal charging station placement assumes EV drivers substitute between stations like drivers of gasoline vehicles even though it takes 4-12 hours to fully charge an EV. This paper uses transaction-level charging data from the Evergy charging network in Kansas City to analyze how drivers substitute across charging stations. I find, unlike gasoline stations, the density of stations in an area has no effect on station usage when there is an increase in charging price. Similarly, previous charging behavior has a much larger effect on driver substitution patterns than the distance between stations or the charging price. These results indicate differences in substitution patterns for gasoline and EV stations which should inform future station placement.

## Current Research Projects

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- “How Do Electric Vehicle Station Subsidies Affect New Station Construction?”

Summary: Over the last decade there have been an increasing number of subsidy programs that encourage the adoption of electric vehicles. One common approach is through subsidizing the construction of electric vehicle charging stations, but it is unclear how much these subsidies induce new station construction. This paper finds that these subsidies increase the number of stations built in areas already experiencing EV adoption but do not have an effect on cities with low EV adoption.

- “How Does Nissan’s Development of EV Charging Stations Affect Vehicle Demand?”

Summary: Nissan incentivized station sales through the development of their own charging network and offered free charging to drivers who bought their vehicles prior to 2019. Using variation in vehicle zip code registration and station installation across years and California zip codes to estimate how slow and fast chargers affect EV adoption.