Bridging Global Governance, Data Analytics, and Social Equity: My Research and Teaching Contributions to ICI

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Truman School of Government and Public Affairs

University of Missouri

Introduction – Who Am I?

As A Scholar

I utilize data-driven and evidence-based methods to examine how government policies and institutional design impact social equity, governance efficiency, and public decision-making.

As An Educator

I foster an inclusive, interactive, and process-oriented learning environment that equips students with critical thinking and problem-solving skills applicable to real-world policy challenges.

Introduction – Who Am I?

- Ph.D. in Public Affairs (University of Missouri)
  - Defended dissertation in February 2025
  - Expected degree conferred in May 2025

- Interdisciplinary Academic Foundation
  - Political Science, Public Affairs, and Economics

- Teaching and Research Expertise in
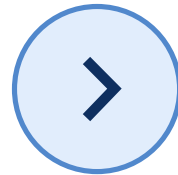 - Public Policy, Public Administration, Social Equity, and Data Analytics
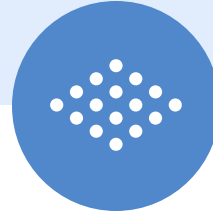
RESEARCH

Research Areas
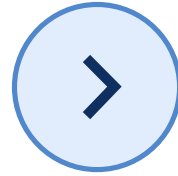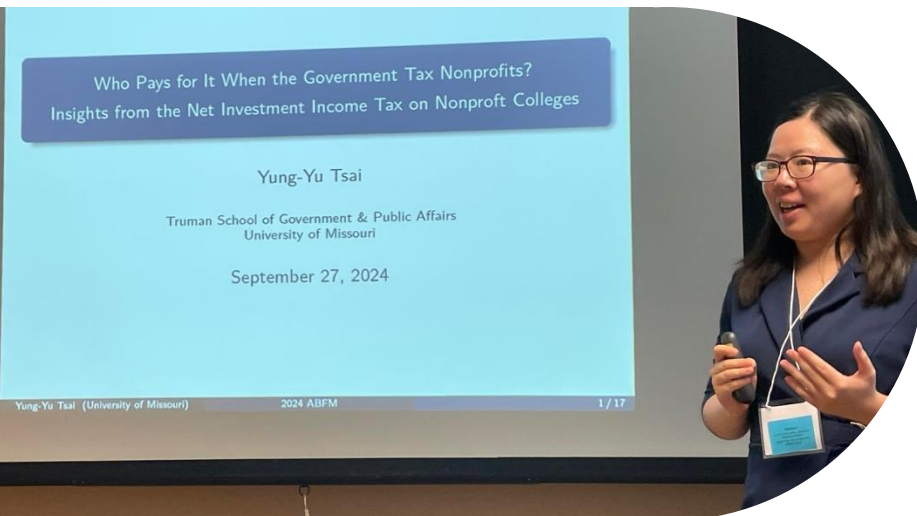
> **Government Policy and Social Equity**
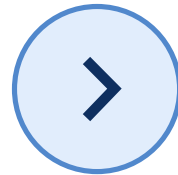
How do government policies impact social equity?

> **Administrative Process in Policy Delivery**

How do administrative practices shape governance and service delivery?

> **Diversity and Representation in Public and Education Institution**

How does institutional diversity shape citizen and student outcomes? And what are the challenges to institutions and leadership?

Research: A Data-Driven, Interdisciplinary Approach to Policy and Governance

Theoretical Foundations

Sociology, public administration, political science, and economics

Methodology

Causal inference and computational social science (e.g., machine learning, big data analysis)

Data Sources

Administrative records, big data (web-scraped & commercial), surveys, and census data

Goal

Generating evidence-based policy recommendations for governments and other governance entities

Impact of Administrative Burdens on College Enrollment

Contents lists available at ScienceDirect

Economics of Education Review

journal homepage: www.elsevier.com/locate/econedurev

The impact of federal administrative burdens on college enrollment

Oded Gurantz [a,*], Yung-Yu Tsai [b]

[a] University of Colorado, United States of America
[b] University of Missouri-Columbia, United States of America

ARTICLE INFO

ABSTRACT

Government programs impose eligibility requirements to balance the goals of improving welfare while minimizing waste. We study the impact of eligibility monitoring in the context of Federal Application for Federal Student Aid (FAFSA) submissions, where students may be subject to "verification" requirements that require them to confirm the accuracy of the data. Using a matching on observables design we do not find that students flagged for verification are less likely to enroll in college, which contrasts prior research. Verification reduces grant aid received but average changes are small, raising questions about the benefits of this administrative process.

Theory Foundation

Administrative Burden (Sociology, Political Science)

Data Source

California Government Administrative Records

Methodology

Machine learning, Matching, RD design

Policy Implication

Policy recommendations for process simplification

Impact of Teacher Favoritism On Student Outcomes

Theory Foundation

Implicit Bias (Sociology, Behavioral Economics)

Data Source

Longitudinal survey (Taiwan Youth Project)

Methodology

Quasi-experiment (randomized within-school)

Policy Implication

Institutional policies for teacher recruiting and training

Contents lists available at ScienceDirect

Journal of Behavioral and Experimental Economics

ELSEVIER

Check for updates

Does undue preference lead to unfairness? The impact of teacher favoritism on teacher treatment and student achievement

Yung-Yu Tsai

Truman School of Government and Public Affairs, University of Missouri, United States

ARTICLE INFO

ABSTRACT

This study investigates the impact of teacher favoritism (i.e., systematically favoring students of a specific gender, ethnicity, or high previous class ranking) on teacher treatment and student achievement. Based on the practice of random class grouping within schools, a school fixed effect model is used to estimate the causal effect of teacher favoritism. The results suggest that teacher favoritism toward students with a higher previous class rank increases the likelihood of these students consulting with their teacher on academic, emotional, and friendship issues. Also, female students are more likely to discuss friendships and emotional matters with pro-

Voluntary Responses During COVID-19 Pandemic

Theory Foundation

Behavioral Economics & Epidemiology

Data Source

National Health Insurance & Google search data

Methodology

Econometrics (Difference-in-Differences)

Policy Implication

Informing public health communication strategies
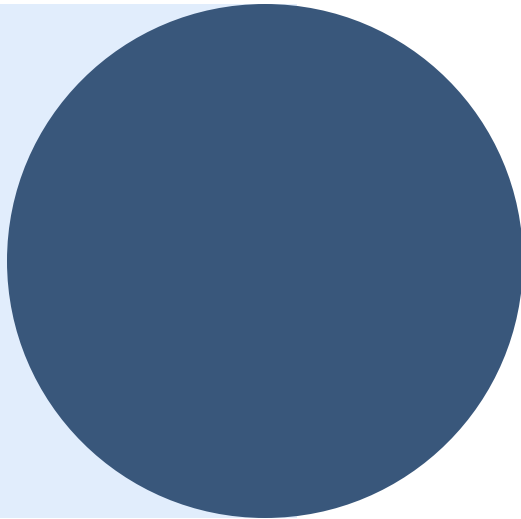
PLOS ONE

RESEARCH ARTICLE

Measuring voluntary responses in healthcare utilization during the COVID-19 pandemic: Evidence from Taiwan
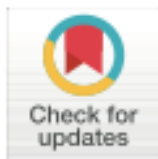
Yung-Yu Tsai[1], Tzu-Ting Yang[2]*

1 Truman School of Government and Public Affairs, University of Missouri, Columbia, MO, United States of America, 2 Institute of Economics, Academia Sinica, Taipei, Taiwan

These authors contributed equally to this work.
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Abstract

Healthcare has been one of the most affected sectors during the coronavirus disease 2019 (COVID-19) pandemic. The utilization of related services for non-COVID-19 diseases fell

Future Research Agenda

> **Government Policy and Social Equity**

How do government policies impact social equity?

> **Administrative Process in Policy Delivery**

How do administrative practices shape governance and service delivery?

> **Diversity and Representation in Public and Education Institution**

How does institutional diversity shape citizen and student outcomes? And what are the challenges to institutions and leadership?

Research Theme 1
Government Policy and Social Equity

- **Question**: How do government policies impact social equity?
- **Example Research**
  - Nonprofit Taxation: How does taxing wealthy nonprofits affect public good provision and access?
  - Taxation Fairness and Housing Justice: How does equity tax reform affect housing justice and wealth inequity?
  - Equity Contracting in Government Procurement: How do policies prioritize disadvantaged firms in government procurement affect social outcomes?
- **Contribution to ICI**
  - Applying data analytics (DA) techniques in governance (GG) research

Research Theme 2
Administrative Process in Policy Delivery

- **Question**: How do administrative practices shape governance and service delivery?
- **Example Research**
  - <u>Administrative Burden</u>: How do burdens in financial aid, funding process, and government contracting affect program effectiveness
  - <u>Informational Signal in Policy Delivery</u>: How do information signals sent out in policy delivery influence citizen behavior
- **Contribution to ICI**
  - Equipping students with practical governance and policy evaluation skills

Research Theme 3
Diversity and Representation

- **Question**: How does institutional diversity shape citizen and student outcomes? And what are the challenges to institutions and leadership?
- **Example Research**
  - Benefit of Representation: Do advantages come from "identity" or "experience?"
  - Burden of Representation: The burden of minority leaders to "represent" their social groups
  - Challenges and Solutions to Improve Diversity and Representation: How do universities utilize their student body to improve student experience, given the limitations in diversity of faculty backgrounds?
- **Contribution to ICI**
  - Social sustainability & inclusive governance focus
  - Informing institutional design, leadership, and diversity strategies
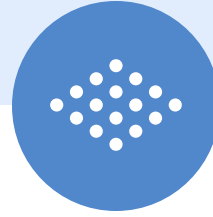
TEACHING

Teaching Experience

Instructor of Record

- State Government (Introduction to Political Science)
- Public Policy Analysis

Guest Lecturer and Teaching Assistant

- Public Policy and Administration
- Public and Nonprofit Management
- American Government and State Government
- Research Methods

Workshop Speaker

- Stata, R, GIS

Teaching Training

Courses Completed

- Truman School Teaching Training Seminar
- Communication and Culture for American College Teaching
- Instructional and Communication Strategies for Effective College Teaching

Certification

- Online Teaching Certification (University of Missouri)

Workshops Participation

- Teaching with Generative Artificial Intelligence
- Leveraging Active Learning to Deepen Student Learning
- Dealing with Academic Dishonesty in Classroom

Teaching Philosophy
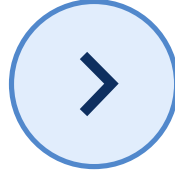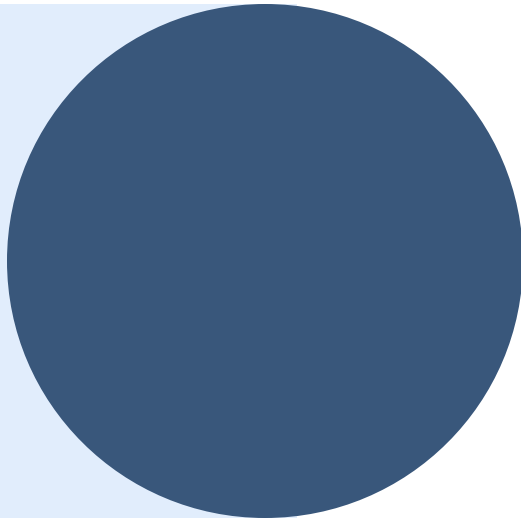
Self-Directed Learning

Empower students to think critically and solve problems independently
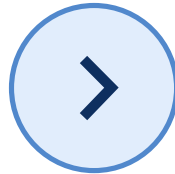
Process-oriented Pedagogy

Emphasize learning through step-by-step reasoning and practice.

Active and Inclusive Engagement

Create an inclusive, interactive, and globally aware classroom
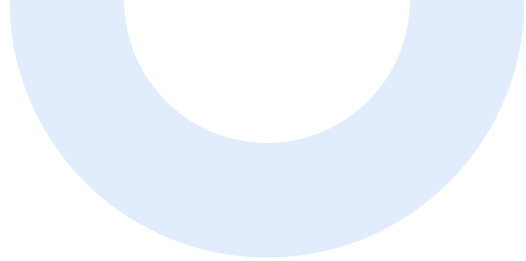
Teaching Philosophy 1
Self-Directed Learning

Prioritizing adaptable problem-solving skills

Encouraging independent and analytical thinking

Helping students take ownership of learning

"I liked the activities you had us do when we met in groups and came up with a solution to a hypothetical scenario"
— Student Evaluation from State Government (2023 Fall)

"Yung-Yu is great with availability, she also encourages you to think through concepts or try a different approach or way of thinking so you learn." — Research Method (2023 Spring)

Are you afraid of Stata errors?

Error r(111)
19 Feb 2018, 18:12

Karolina Brodin

Join Date: Feb 2018
Posts: 1

Hi,

I just started to learn Stata today and I can`t get my do.file to run.

I am trying to run http://masteringmetrics.com/wp-conte...9_hicompare.do

and I get the error code r(111):

1 group found, 2 required r(420); Error
27 Apr 2018, 16:13

Eva Brown

Join Date: Apr 2018
Posts: 2

Hi Everyone,

I'm running a lot of ttests and I keep getting this error whenever there are
code:

```
foreach region in list {
bysort ethnicity: ttest meanscore, by(survey)
bysort personofcolor: ttest meanscore, by(survey)
bysort gender: ttest meanscore, by(survey)
bysort cgp: ttest meanscore, by(survey)
bysort economicbackground: ttest meanscore, by(survey)
}
```

Error r(100) - Varlist Required
24 Jun 2018, 19:29

Shilpi Mukherjee

Join Date: Jun 2018
Posts: 1

```
Hello,
I am fairly new to Stata and am trying to write a code to understand the sequence of flights.My code is
set obs 509519
local count = 1
local slno = 1
gen sequence = _n
forval slno = 1(1)509517{
replace `sequence' = `count' in `slno'
while ((flightnum[`slno'] == flightnum[`slno' + 1]) && (tailnum[`slno'] == tailnum[`slno'+1])){
replace `sequence' = `count' in `slno'
replace `count' = `count' + 1
replace `slno' =`slno' + 1
}
```

Outline

❶ Error vs. Warning: Why do we need to care about error?

❷ Understanding: What do error messages and help files say?

❸ Debugging: What if there are no clear error messages?

❹ Handling: What if the errors are inevitable?

❺ Fixing: What if the errors come from the author of the command?

18

Group number	1
Group members	████████████████████
Assigned state	Illinois
Political culture	Individualistic
Voting registration deadline	16 days before Election Day
Absentee voting or vote by mail allowed?	absentee voting by mail is allowed, but last d
Turnout rate at the 2020 General Election	A democratic vote favored 72.92%; 20 electo
Are different languages available on the website?	No
How long does it take to find the information?	10 min

Group number	7
Group members	████████████████████
Assigned state	California
Political culture	Moralistic
Voting registration deadline	February 20, 2024
Absentee voting or vote by mail allowed?	Yes, voting by mail and absentee voting is allowed.
Turnout rate at the 2020 General Election	17,785,151; 80.67% turnout registered, 70.88% turnout eligible source
Are different languages available on the website?	Yes, available in Spanish, Chinese, Hindi, Japanese, Khmer, Korean, Tagalog, Thai or Vietnamese
How long does it take to find the information?	Quite easy to find the information, did not take long, maybe a couple of minutes.

Teaching Philosophy 2
Process-Oriented Pedagogy

Emphasizing step-by-step learning and improvement

Design course activities to observe thinking process

Providing detailed feedback for student growth

"The set of assignments through the course have induced a need and desire for thorough understanding of a topic of our own interest and choosing. Each assignment builds from a foundation established by the previous assignment instead of each assignment more relating to just the current week's material."
— Student Evaluation from Public Policy Analysis (2024 Fall)

"She is very interactive and supportive of students' efforts by providing uncompromising and specific feedback that provides students with a clear vision to the path of improvement." — Student Evaluation from Public Policy Analysis (2024 Fall)

Part 2. Multivariate regression results

(5 points) Create a table showing the results of your multivariate regression (refer to the lecture material for guidance and examples)

Table 2. OLS Regression predicting feelings towards Joe Biden in the run-up to the 2020 election	
	Coefficient (std error)
Gun Ownership	-1.00 (.09)
Sex (male was reference category) Female	5.39 (.96)
Guns	1.58 (5.2)
LGBTQ+ Yes	21.83(3.0)
Tucker Carlson Tonight Viewer (No was reference category) Yes	6.86 (1.34)

Data Source: National Election Survey 2020
Sample Size: 5,349

(5 points) Discuss the statistical and substantive interpretation for *each* of the independent variables in your regression model.
- Sex: Our p value was less than .05 which indicates a good fit. Females, on average rated Biden 5.05 points higher than males.
- Guns: Our P values were less than .05 which indicates a good fit. Gun owners, on average rated Biden 1 point lower than non gun owners.
- LGBT: Our p value was less than .05 which indicates good fit. LGBTQ+ respondents rated Biden 21.83 points higher than heterosexual respondents.
- Tucker: Our p value was less than .05 which indicates good fit. Tucker Carlson tonight viewers rated Biden 6.86 points higher than non-viewers.

Part 3. Conclusions and next steps

(4 points) Based on your research question and brief literature review, what have you learned from your analysis? D
- There were a few surp
  viewers and Biden the
  data because it was ha
  positive relationship. I

Comments (right panel):

Yung-Yu Tsai
I think you table results have some problem.
The result I get is different from yours. Feel free to show me your code and Stata output. and I can [...]

Yung-Yu Tsai
For all the coefficients we may want to use star annotation to label significance.
You can use *p<0.05, **p<0.01, ***p<0.001 [...]

Yung-Yu Tsai
Did you include both the number of guns and gun ownership in the regression?
It is fine. But the interpretation would change (which would be [...]

Yung-Yu Tsai
Even we do not interpret constant (intercept), you still need to put it in the table.
1 Reply

Yung-Yu Tsai
The coefficient you cite here is different from the table you report (also different from the result I got from my side).
Where do you get these results? [...]

Yung-Yu Tsai
Since you include both "numbers of guns" and "gun owners" in the regression, the interpretation here

The problem of foreign aid being misused is a problem that effects every American and there must be solutions or else the citizens money will continue to be wasted. There can be many possible approaches to this issue and one alternative would be to do nothing and let this continue unchecked. This option would have the most feasibility due to there being no change required. By not changing and continuing to allow this current practice of foreign aid accountability to remain it reaches no solution to the problem facing this country. This lack of action would have no effectiveness in combating the possible fraudulent use and disregard for accountability of taxpayer's dollars. Also, this proposed policy alternative would have no adverse cost because keeping the status quo neither costs nor saves any money, since the relevant actions remain the same and so would the cost.

Another policy alternative that would be worth considering is stopping all foreign aid completely. This could in theory be achieved with little to no effort from our legislative bodies, but in practice that would be a different story because as we have seen the massive back and forth between how much foreign aid to send to certain places in previous years. In reality, the feasibility of this alternative would be almost impossible because the vast majority of our legislature would have to agree that no foreign aid is the best solution. This would be a monumental foreign relation policy shift towards isolationism, that hasn't been seen in the United States since before World War II (Office of the Historian). Another consideration to this policy is the cost, though it would save the United States Billions of dollars, allowing us to solve most domestic problems with ease, the potential for strained international relations is immense, the US utilizes aid not just to be a kind neighbor but to secure loyalty and prevent other hostile nations to influence the country receiving the aid. The effectiveness of this policy would be absolute, by not giving away any money then we have stopped all foreign aid. Though the end goal of no more foreign ad would be accomplished the foreign relations and geopolitical ramifications would be mighty.

The third option would be for Congress to pass a law requiring the monitoring of foreign aid once it has left the United States. This could be done relatively simply if our legislative bodies set forth laws that would make sure foreign aid is spent on what it was intended for. The US has already made efforts in transparency for foreign aid in the Foreign Aid Transparency and Accountability Act in 2016. This act required the monitoring, evaluation and reporting to the American public to increase transparency of how much money is being given to foreign countries and for what purpose (Foreign Assistance). If put into practice this policy would be dependent on the countries to show that the money was spent honestly. This could be problematic, due to countries'

Comments (right panel):

Yung-Yu Tsai
The status quo doesn't necessarily mean "doing nothing." In current practice, the government could still decide to discontinue future aid, or use diplomatic approaches for [...]

Yung-Yu Tsai
You used three criteria to evaluate the alternatives, but you didn't define or explain these terms. Additionally, there's no justification for why you chose these criteria. Providing brie [...]

Yung-Yu Tsai
Is the Foreign Aid Transparency and Accountability Act the "status quo?" Does it overlap with your first alternative, or is it exclusive to the third alternative? Clarifying this w [...]

Yung-Yu Tsai
You mention "if put into practice"— does this imply the act is not yet in effect? My understanding is that it has been passed and is already operational. Clarifying this would [...]

negative relationships.

3. (2 points) Provide a statistical and substantive interpretation of the **odds ratios** for **age** and for **relig**.

. logistic affairs c.age c.relig

Logistic regression
Number of obs = 601
LR chi2(2) = 10.55
Prob > chi2 = 0.0051
Log likelihood = -332.41147
Pseudo R2 = 0.0156

affairs	Odds ratio	Std. err.	z	P>|z|	[95% conf. interval]
age	.993939	.0102393	-0.59	0.555	.9740717 1.014212
relig	.7691529	.0632986	-3.19	0.001	.6545785 .9037817
_cons	.896735	.3079947	-0.25	0.801	.3840348 2.093980

Note: _cons estimates baseline odds.

a.
. logistic affairs c.age

Logistic regression
Number of obs = 601
LR chi2(1) = 0.18
Prob > chi2 = 0.6641
Log likelihood = -337.59419
Pseudo R2 = 0.0003

affairs	Odds ratio	Std. err.	z	P>|z|	[95% conf. interval]
age	.9955713	.0102093	-0.43	0.665	.9757611 1.015784
_cons	.3840199	.1322318	-2.78	0.005	.1955485 .7541417

Note: _cons estimates baseline odds.

b.

Commented [DR1]: What's not clear from the presentations is whether these logistical regressions are supposed to be run with all variables or – as the question suggests – just these two variables or individually. I've included all regressions to demonstrate ability to run.

Yung-Yu Tsai
Yes, you only need to interpret the results from question 1. You do not need to re-run a regression.

Teaching Philosophy 3
Active and Inclusive Engagement

Creating an interactive and inclusive learning environment

Encouraging global and interdisciplinary perspectives

Providing personalized support for students

"Your effort does not go unnoticed and I applaud your creativity in the class activities, as well as all the effort you would put into making the class interesting, productive, and yet not stressful."
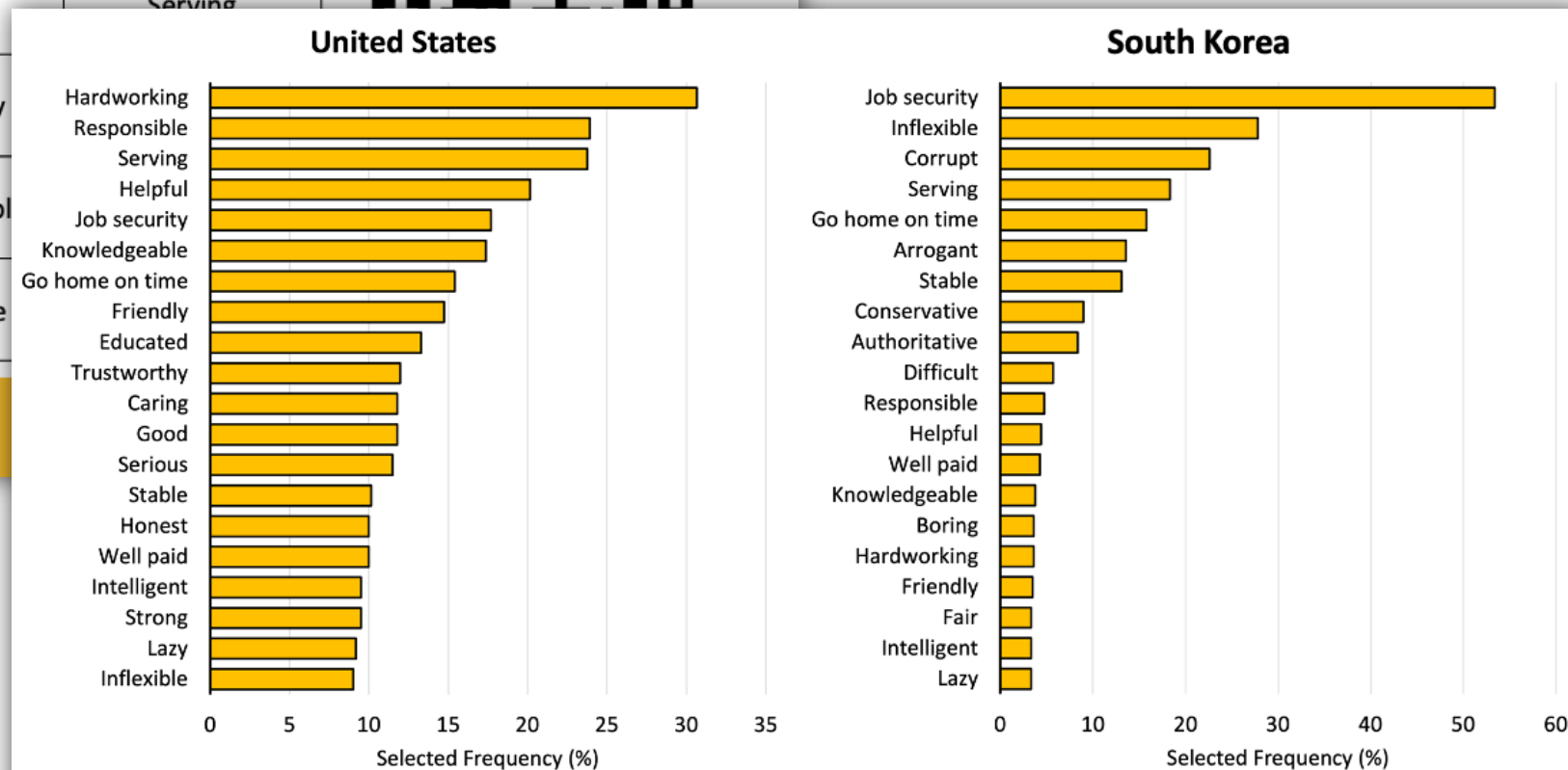— Student Evaluation from State Government (2023 Fall)

"Your words of encouragement really do help when students like me are struggling or frustrated. This course has been rather difficult but your willingness and patience has made the difference."
— Student Evaluation from Research Methods (2023 Spring)

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Which Keywords Come to Your Mind When Think about Public Workers / Civil Servants?

Arrogant	Difficult	Helpful	Serious
Authoritative	Educated	Inflexible	Serving
Caring	Friendly	Job security	
Conservative	Go home on time	Knowledgeabl	
Corrupt	Hardworking	Responsible	

United States

Selected Frequency (%)

Hardworking, Responsible, Serving, Helpful, Job security, Knowledgeable, Go home on time, Friendly, Educated, Trustworthy, Caring, Good, Serious, Stable, Honest, Well paid, Intelligent, Strong, Lazy, Inflexible

South Korea

Selected Frequency (%)

Job security, Inflexible, Corrupt, Serving, Go home on time, Arrogant, Stable, Conservative, Authoritative, Difficult, Responsible, Helpful, Well paid, Knowledgeable, Boring, Hardworking, Friendly, Fair, Intelligent, Lazy

University of Missouri

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Course Offerings & Development

Core Courses

- Political Science (GG)
- Public Administration (GG)
- Global Health Governance (GG)
- Data Science & Big Data (DA)

Elective Courses

- Public Policy: Policy Innovation, Analysis, and Advocation (GG)
- Social Policy in Asia and Global Setting (GG & SS)
- Governance and Social Equity (GG & SS)
- Policy Trade-Offs in Global Governance (GG & SS)
- Causal Inference in Social Science (DA)
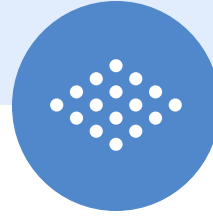
SUMMARY

Summary – Why ICI? Why Me?

Strong Alignment with ICI's Mission

- Research connects governance, data analytics, and social equity
- Apply policy-relevant research to real-world governance challenges

Expertise in Interdisciplinary Research & Teaching

- Bridging policy, data science, and social sustainability across ICI's tracks
- Using various methods to equip students with analytical skills

Commitment to Student Engagement & Institutional Development

- Interactive, inclusive, and process-driven teaching for global challenges
- Research expertise in institutional policy supports program and diversity and inclusion in education setting

Summary – My Contribution to ICI

Global Governance (GG)

- Foundation in public administration, political science, and public policy
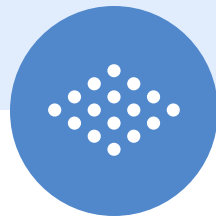- Research focuses on policy evaluation and governance effectiveness

Data Analytics (DA)

- Expertise in econometrics, causal inference, and big data analysis
- Applying data-driven insights to policymaking

Sustainability & Society (SS)

- Research on social equity, diversity & inclusion
- Teaching fosters inclusion and real-world application

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THANK YOU!

http://yungyutsai.github.io/files/JobTalk_ICI.pdf