Is there a Critical Mass?
Gender Composition and Behavior in U.S. City Councils.

Emilia Brito Rebolledo  
(Brown University)

Jesse Bruhn  
(Brown University)

Thea How Choon  
(St. Lawrence University)

E. Anna Weber  
(West Point)

All opinions are those of the authors and do not represent the opinions of the United States Military Academy, the Department of Defense, or the United States Army.
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Du 2004) - “Critical mass” theory from political science: women must be at least 15-30% of a political body before preferences are reflected (Kanter 1977). Experimentally identified behavioral effects of gender composition (e.g. Stoddard et al. 2020). Findings have never been replicated outside a lab or “lab-in-the-field” type setting. Identification “in-the-wild” is difficult: Requires data on the internal workings of a consequential decision making process. And random variation in group gender composition. How does the participation of women in a political group change as the share of women increases? How do any changes in participation affect policy outcomes?
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Duflo 2004)
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Duflo 2004)

- “Critical mass” theory from political science: women must be at least 15-30% of a political body before preferences are reflected (Kanter 1977).
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Duflo 2004)
- “Critical mass” theory from political science: women must be at least 15-30% of a political body before preferences are reflected (Kanter 1977).

Experimentally identified behavioral effects of gender composition (e.g. Stoddard et al. 2020).
- Findings have never been replicated outside a lab or “lab-in-the-field” type setting.
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Duflo 2004)

- “Critical mass” theory from political science: women must be at least 15-30% of a political body before preferences are reflected (Kanter 1977).

Experimentally identified behavioral effects of gender composition (e.g. Stoddard et al. 2020).

- Findings have never been replicated outside a lab or “lab-in-the-field” type setting.

Identification “in-the-wild” is difficult:

- Requires data on the internal workings of a consequential decision making process.
- And random variation in group gender composition.
Does women’s representation influence political decision making?

Mixed evidence as to whether women’s political representation affects policy outcomes (Ferreira and Gyourko 2014; Chattopadhyay and Duflo 2004)

- “Critical mass” theory from political science: women must be at least 15-30% of a political body before preferences are reflected (Kanter 1977).

Experimentally identified behavioral effects of gender composition (e.g. Stoddard et al. 2020).

- Findings have never been replicated outside a lab or “lab-in-the-field” type setting.

Identification “in-the-wild” is difficult:

- Requires data on the internal workings of a consequential decision making process.
- And random variation in group gender composition.

How does the participation of women in a political group change as the share of women increases? How do any changes in participation affect policy outcomes?
Study this question empirically in US city councils.
Study this question empirically in US city councils.

**Key innovation:** digitize over 40,000 PDFs of city council meeting minutes.
- Pair with new national election data compiled from over 3,500 FOIA requests.
- **Identification:** canonical “close-election” RD between men and women.
- Explore impacts on individual / group behavior, voting patterns, and policy.

**Key findings:**
- Replacing male councilor with female causes a 25p.p. increase in women’s participation despite only causing a 20p.p. increase in council female share.
- Discrepancy driven by a behavioral effect: women with at least one female colleague participate more than otherwise similar isolated women.
- No detectable impact on voting patterns or policy outcomes. Consistent with “behavioral” model of critical mass with similar female/male preferences.
Study this question empirically in US city councils.

**Key innovation:** digitize over 40,000 PDFs of city council meeting minutes.
- Pair with new national election data compiled from over 3,500 FOIA requests.
- **Identification:** canonical “close-election” RD between men and women.
- Explore impacts on individual / group behavior, voting patterns, and policy.

**Key findings:**
- Replacing male councilor with female causes a 25p.p. increase in women’s participation despite only causing a 20p.p. increase in council female share.
Study this question empirically in US city councils.

**Key innovation:** digitize over 40,000 PDFs of city council meeting minutes.
- Pair with new national election data compiled from over 3,500 FOIA requests.
- **Identification:** canonical “close-election” RD between men and women.
- Explore impacts on individual / group behavior, voting patterns, and policy.

**Key findings:**
- Replacing male councilor with female causes a 25p.p. increase in women’s participation despite only causing a 20p.p. increase in council female share.
- Discrepancy driven by a behavioral effect: women with at least one female colleague participate more than otherwise similar isolated women.
Study this question empirically in US city councils.

**Key innovation:** digitize over 40,000 PDFs of city council meeting minutes.
- Pair with new national election data compiled from over 3,500 FOIA requests.
- **Identification:** canonical “close-election” RD between men and women.
- Explore impacts on individual / group behavior, voting patterns, and policy.

**Key findings:**
- Replacing male councilor with female causes a 25p.p. increase in women’s participation despite only causing a 20p.p. increase in council female share.
- Discrepancy driven by a behavioral effect: women with at least one female colleague participate more than otherwise similar isolated women.
- No detectable impact on voting patterns or policy outcomes.
Study this question empirically in US city councils.

**Key innovation:** digitize over 40,000 PDFs of city council meeting minutes.
- Pair with new national election data compiled from over 3,500 FOIA requests.
- **Identification:** canonical “close-election” RD between men and women.
- Explore impacts on individual / group behavior, voting patterns, and policy.

**Key findings:**
- Replacing male councilor with female causes a 25p.p. increase in women’s participation despite only causing a 20p.p. increase in council female share.
- Discrepancy driven by a behavioral effect: women with at least one female colleague participate more than otherwise similar isolated women.
- No detectable impact on voting patterns or policy outcomes.

Consistent with “behavioral” model of critical mass with similar female/male preferences.
Contributions

First empirical exploration of critical mass using quasi-experimental methods:
- Descriptive / qualitative work discussed in Bratton (2005), Kanter (1997), and others.
- Fifty year old hypothesis that has largely gone untested.

First estimates of group gender "behavioral effect" outside a lab / lab-in-the-field setting:
- Born et al. (2022), Bordalo et al. (2019), Chen and Houser (2019), Cozman, (2014), Cozman et al. (2021), and Stoddard et al. (2020).
- Our results build the case for the external validity of this large literature.

Contributes to broader literature on gender in politics by studying city councils:
- Ferreira and Gyourko (2014), Gagliarducci and Paserman (2012), Chattopadhyay and Du (2004), Wasserman (WP) and others.
- Our results + model suggest male/female preferences drive much heterogeneity.
- Also related work on race and political representation (e.g. Beach and Jones, 2017).
Contributions

First empirical exploration of critical mass using quasi-experimental methods:
- Descriptive / qualitative work discussed in Bratton (2005), Kanter (1997), and others.
- Fifty year old hypothesis that has largely gone untested.

First estimates of group gender "behavioral effect" outside a lab / lab-in-the-field setting:
- Born et al. (2022), Bordalo et al. (2019), Chen and Houser (2019), Coisman, (2014), Coisman et al. (2021), and Stoddard et al. (2020).
- Our results build the case for the external validity of this large literature.

Contributes to broader literature on gender in politics by studying city councils:
- Ferreira and Gyourko (2014), Gagliarducci and Paserman (2012), Chattopadhyay and Duflo (2004), Wasserman (WP) and others.
- Our results + model suggest male/female preferences drive much heterogeneity.
- Also related work on race and political representation (e.g. Beach and Jones, 2017).
Contributions

First empirical exploration of critical mass using quasi-experimental methods:
- Descriptive / qualitative work discussed in Bratton (2005), Kanter (1997), and others.
- Fifty year old hypothesis that has largely gone untested.

First estimates of group gender “behavioral effect” outside a lab / lab-in-the-field setting:
- Born et al. (2022), Bordalo et al. (2019), Chen and Houser (2019), Coffman, (2014),
  Coffman et al. (2021), and Stoddard et al. (2020).
- Our results build the case for the external validity of this large literature.
Contributions

First empirical exploration of critical mass using quasi-experimental methods:
- Descriptive / qualitative work discussed in Bratton (2005), Kanter (1997), and others.
- Fifty year old hypothesis that has largely gone untested.

First estimates of group gender “behavioral effect” outside a lab / lab-in-the-field setting:
- Born et al. (2022), Bordalo et al. (2019), Chen and Houser (2019), Coffman, (2014), Coffman et al. (2021), and Stoddard et al. (2020).
- Our results build the case for the external validity of this large literature.

Contributes to broader literature on gender in politics by studying city councils:
- Ferreira and Gyourko (2014), Gagliarducci and Paserman (2012), Chattopadhyay and Duflo (2004), Wasserman (WP) and others.
- Our results + model suggest male/female preferences drive much heterogeneity.
- Also related work on race and political representation (e.g. Beach and Jones, 2017).
Institutional and Electoral Context

Typical US city council characterized by:

- 5-7 members, ⇡ 3 seats up for election every 2 years.
- Direct election of councilors with (usually) no party affiliation listed on ballot.
- Collaboration in committee settings to develop local projects and administration.
Institutional and Electoral Context

Typical US city council characterized by: (National League of Cities, 2023):
- 5-7 members, \( \approx 3 \) seats up for election every 2 years.
- Direct election of councilors with (usually) no party affiliation listed on ballot.
- Collaboration in committee settings to develop local projects and administration.
Institutional and Electoral Context

Typical US city council characterized by: (National League of Cities, 2023):
- 5-7 members, \( \approx 3 \) seats up for election every 2 years.
- Direct election of councilors with (usually) no party affiliation listed on ballot.
- Collaboration in committee settings to develop local projects and administration.

Close Cross-Gender Election

Female A Wins  
Male B Wins

"Focal" Member

Female L  Female L  "Non-Focal" Members
Male M  Male M
Male N  Male N
Male O  Male O
Male P  Male P

N = 1  
Non-Focal Women  
Example

(prior elections, other races, or far from at-large margin)
Data

Sample begins with the Annual Survey of City Government (ASCG).
- Expenditures measured annually for various categories of municipal spending.
Data

Sample begins with the Annual Survey of City Government (ASCG).
- Expenditures measured annually for various categories of municipal spending.

Election data for 2008-2015 from two sources:
- 3,500 FOIA requests to ASCG sample
- Pre-existing election data from California Election Data Archive.
Data

Sample begins with the Annual Survey of City Government (ASCG).
- Expenditures measured annually for various categories of municipal spending.

Election data for 2008-2015 from two sources:
- 3,500 FOIA requests to ASCG sample
- Pre-existing election data from California Election Data Archive.

Meeting minutes:
- 40,000 PDF’s collected from cities with close gendered elections.
- Extract basic “meta-data” on attendance, meeting dates, etc. from every PDF.
- Extract “motions data” on who moved/second, votes for/against, and topics for every motion made during 3 randomly chosen meetings each council-year.
Data

Sample begins with the Annual Survey of City Government (ASCG).
- Expenditures measured annually for various categories of municipal spending.

Election data for 2008-2015 from two sources:
- 3,500 FOIA requests to ASCG sample
- Pre-existing election data from California Election Data Archive.

Meeting minutes:
- 40,000 PDF’s collected from cities with close gendered elections.
- Extract basic “meta-data” on attendance, meeting dates, etc. from every PDF.
- Extract “motions data” on who moved/second, votes for/against, and topics for every motion made during 3 randomly chosen meetings each council-year.

Estimation sample of small to mid-size cities for 34 states over ≈ 8 years.
Minutes
City Council/Redevelopment Agency/Public Financing Authority
City of Huntington Beach

Monday, November 15, 2010
4:00 PM - Room B-8
6:00 PM - Council Chambers
Civic Center, 2000 Main Street
Huntington Beach, California 92648

An audio recording of the 4:00 PM portion of this meeting and a video recording of the 6:00 PM portion of this meeting are on file in the Office of the City Clerk and are archived at www.surfcity-hb.org/government/agendas/

4:00 PM - ROOM B-8

The City Clerk recessed until 4:30 PM due to a lack of quorum.

CALL TO ORDER - 4:35 PM

ROLL CALL

Present: Carchio, Coeeper (arrived at 5:15 PM for Closed Session), Hardy, Green, Bohr, Dwyer, and Hansen

ANNOUNCEMENT OF COMMUNICATIONS RECEIVED AFTER AGENDA DISTRIBUTION

Pursuant to the Brown "Open Meetings" Act, City Clerk Joan Flynn announced that the following communication was received by her office after distribution of the City Council agenda packet:

Communication received from Shari L. Freidenrich, CPA, City Treasurer, dated November 15, 2010 entitled City of Huntington Beach Investment Advisory Board (IAB) Annual Report to the City Council for the Period October 1, 2009 to September 30, 2010.


A motion was made by Coeper, second Hardy to after the City Clerk reads by title, approve for introduction Ordinance No. 3905, "An Ordinance of the City of Huntington Beach Amending Chapter 14.12 of the Huntington Beach Municipal Code Relating to Water Billing." The motion carried by the following roll call vote:

AYES: Carchio, Coeper, Hardy, Green, Bohr, Dwyer, and Hansen
NOES: None

ORDINANCES FOR ADOPTION


A motion was made by Hansen, second Carchio to after the City Clerk reads by title, approve for introduction Ordinance No. 3905, "An Ordinance of the City of Huntington Beach Amending Chapter 14.12 of the Huntington Beach Municipal Code Relating to Water Billing." The motion carried by the following roll call vote:

AYES: Carchio, Coeper, Green, Dwyer, and Hansen
NOES: Hardy, and Bohr

30. Adopted Ordinance No. 3903 accepting modifications to Local Coastal Program Amendment (LCPA) No. 2-10 approved by the California Coastal Commission and amend the Local Coastal Program (LCP) accordingly Approved for introduction November 1, 2010.

A motion was made by Hansen, second Coeper to after the City Clerk reads by title, adopt Ordinance No. 3903, "An Ordinance of the City Council of the City of Huntington Beach amending sections 203.06, 216.04, 216.18, 221.10 and 230.82 of the Huntington Beach Zoning and Subdivision Ordinance thereof to conform LCP Amendment No. 2-10 made by the California Coastal Commission." The motion carried by the following roll call vote:

AYES: Carchio, Coeper, Hardy, Green, Bohr, Dwyer, and Hansen
NOES: None
## Council Meeting Characteristics

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>1 Non-Focal Women</th>
<th>&gt; 1 Non-Focal Women</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Process</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of meetings</td>
<td>45.3</td>
<td>45.2</td>
<td>43.4</td>
</tr>
<tr>
<td>Meeting length</td>
<td>146.7</td>
<td>138</td>
<td>160.7</td>
</tr>
<tr>
<td><strong>Panel B: Motions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moved by women (share)</td>
<td>0.3</td>
<td>0.26</td>
<td>0.43</td>
</tr>
<tr>
<td>Seconded by women (share)</td>
<td>0.35</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Passed</td>
<td>0.93</td>
<td>0.92</td>
<td>0.93</td>
</tr>
<tr>
<td>Passed Unanimously</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Panel C: Topics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admin (share)</td>
<td>0.61</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Finance (share)</td>
<td>0.19</td>
<td>0.19</td>
<td>0.2</td>
</tr>
<tr>
<td>Public Utility (share)</td>
<td>0.13</td>
<td>0.14</td>
<td>0.13</td>
</tr>
<tr>
<td>Regulation (share)</td>
<td>0.10</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>Observations (councils)</td>
<td>325</td>
<td>136</td>
<td>124</td>
</tr>
</tbody>
</table>
Empirical Design

\[ Y_c = \beta \text{FemWin}_c + F(\text{FemVoteMargin}_c) + \Gamma X_c + \epsilon_c \] (1)
Empirical Design

\[ Y_c = \beta \text{FemWin}_c + F(\text{FemVoteMargin}_c) + \Gamma X_c + \varepsilon_c \]  

Identification: Victory is random in a neighborhood of the threshold.
- Balanced on pre-determined characteristics.  
- Smooth density in the neighborhood of the cutoff.
Empirical Design

\[ Y_c = \beta \text{FemWin}_c + F(\text{FemVoteMargin}_c) + \Gamma X_c + \epsilon_c \]  

(1)

**Identification:** Victory is random in a neighborhood of the threshold.
- Balanced on pre-determined characteristics.
- Smooth density in the neighborhood of the cutoff.

**Preferred Model:**
- Includes council size, term length, and baseline spending as controls for precision.
- Specify \( F() \) as piece-wise linear around the threshold.
- Data-driven bandwidth fixed across outcomes within each sample (Calonico et al., 2020).
Empirical Design

\[ Y_c = \beta \text{FemWin}_c + F(\text{FemVoteMargin}_c) + \Gamma X_c + \epsilon_c \]  

(1)

**Identification:** Victory is random in a neighborhood of the threshold.

- Balanced on pre-determined characteristics. [Balance]
- Smooth density in the neighborhood of the cutoff. [Density]

**Preferred Model:**

- Includes council size, term length, and baseline spending as controls for precision.
- Specify \( F() \) as piece-wise linear around the threshold.
- Data-driven bandwidth fixed across outcomes within each sample (Calonico et al., 2020).

**Robustness:** Similar results with no controls, varying the functional form of \( F() \), allowing bandwidth to vary, and fixing the bandwidth across samples.
Female Win Effect on Female Representation

(a) Female Share: All Councilors
Female Win Effect on Female Representation

Increase in female rep of approx 20 p.p., composition of rest of council continuous.
Female Win Effect on Female Participation

(a) Share of Motions made by Women
Female Win Effect on Female Participation

Share of motions by women increases by *more* than increase in rep., in part driven by increase in motions by otherwise isolated non-focal women.
## Female Win Effects for Full Council Motions

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>1 Non-Focal Woman</th>
<th>&gt; 1 Non-Focal Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>No. of Motions</td>
<td>-4.962</td>
<td>-6.038</td>
<td>4.004</td>
</tr>
<tr>
<td></td>
<td>(5.674)</td>
<td>(8.180)</td>
<td>(8.580)</td>
</tr>
<tr>
<td>Share moved by women</td>
<td>0.247***</td>
<td>0.301***</td>
<td>0.156*</td>
</tr>
<tr>
<td></td>
<td>(0.048)</td>
<td>(0.054)</td>
<td>(0.080)</td>
</tr>
<tr>
<td>Share seconded by women</td>
<td>0.235***</td>
<td>0.267***</td>
<td>0.214***</td>
</tr>
<tr>
<td></td>
<td>(0.055)</td>
<td>(0.068)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Share moved or seconded by women</td>
<td>0.335***</td>
<td>0.394***</td>
<td>0.217***</td>
</tr>
<tr>
<td></td>
<td>(0.060)</td>
<td>(0.072)</td>
<td>(0.083)</td>
</tr>
<tr>
<td>Share moved and seconded by women</td>
<td>0.077**</td>
<td>0.084***</td>
<td>0.100</td>
</tr>
<tr>
<td></td>
<td>(0.035)</td>
<td>(0.025)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>0.076</td>
<td>0.055</td>
<td>0.070</td>
</tr>
<tr>
<td>Observations</td>
<td>325</td>
<td>136</td>
<td>124</td>
</tr>
</tbody>
</table>
Female Win Effects for Non-Focal Council Motions

<table>
<thead>
<tr>
<th></th>
<th>1 Non-Focal Woman</th>
<th>&gt; 1 Non-Focal Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men (1)</td>
<td>Women (2)</td>
</tr>
<tr>
<td>No. of Motions</td>
<td>-6.531 (5.839)</td>
<td>4.349** (1.967)</td>
</tr>
<tr>
<td>Share moved by women</td>
<td>0.148** (0.058)</td>
<td>-0.045 (0.095)</td>
</tr>
<tr>
<td>Share seconded by women</td>
<td>0.088 (0.076)</td>
<td>0.032 (0.089)</td>
</tr>
<tr>
<td>Share moved or seconded by women</td>
<td>0.219*** (0.064)</td>
<td>0.142 (0.087)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>0.055</td>
<td>0.055</td>
</tr>
<tr>
<td>Observations</td>
<td>136</td>
<td>136</td>
</tr>
</tbody>
</table>

|                                | Men (3)          | Women (4)          |
| No. of Motions                 | 3.695 (4.742)    | 0.494 (4.340)      |
| Share moved by women           | 0.142 (0.087)    |                   |
| Share seconded by women        | 0.070 (0.087)    |                   |
| Share moved or seconded by women| 0.142 (0.087)    |                   |
| Bandwidth                      | 0.070            |                   |
| Observations                   | 124              | 124                |

No additional behavioral effect once two women on council.
# Female Win Effects for Full Council Voting Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>1 Non-Focal Woman</th>
<th>&gt; 1 Non-Focal Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Share unanimous</td>
<td>0.005</td>
<td>-0.015</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.052)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>Share failed</td>
<td>0.005</td>
<td>-0.000</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Vote margin</td>
<td>0.012</td>
<td>-0.084</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td>(0.252)</td>
<td>(0.215)</td>
</tr>
<tr>
<td>Votes in favor</td>
<td>0.007</td>
<td>-0.062</td>
<td>0.036</td>
</tr>
<tr>
<td></td>
<td>(0.072)</td>
<td>(0.140)</td>
<td>(0.111)</td>
</tr>
<tr>
<td>Votes against</td>
<td>0.003</td>
<td>0.010</td>
<td>0.027</td>
</tr>
<tr>
<td></td>
<td>(0.044)</td>
<td>(0.068)</td>
<td>(0.076)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>0.076</td>
<td>0.055</td>
<td>0.070</td>
</tr>
<tr>
<td>Observations</td>
<td>325</td>
<td>136</td>
<td>124</td>
</tr>
</tbody>
</table>

No evidence of “gridlock” or changes in internal voting strategy.
Female Win Effects on Per-Capita Spending

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Public Utility</th>
<th>Health and Hospital</th>
<th>Parks and Recreation</th>
<th>Library</th>
<th>Housing and Com Dev</th>
<th>Airports and Water Ports</th>
<th>Police and Fire</th>
<th>Sewerage and Waste</th>
<th>Roads and Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
<td>(8)</td>
<td>(9)</td>
<td>(10)</td>
</tr>
<tr>
<td></td>
<td>(123.392)</td>
<td>(44.313)</td>
<td>(9.443)</td>
<td>(13.942)</td>
<td>(5.177)</td>
<td>(40.067)</td>
<td>(8.363)</td>
<td>(20.837)</td>
<td>(55.610)</td>
<td>(38.663)</td>
</tr>
<tr>
<td>1 Non-focal Woman</td>
<td>101.065</td>
<td>-19.421</td>
<td>-5.829</td>
<td>-21.668</td>
<td>-12.070**</td>
<td>103.363</td>
<td>17.964*</td>
<td>40.074</td>
<td>-0.296</td>
<td>-4.017</td>
</tr>
<tr>
<td>&gt; 1 Non-focal Woman</td>
<td>-147.084</td>
<td>-82.800</td>
<td>1.860</td>
<td>8.677</td>
<td>-8.021</td>
<td>-16.694</td>
<td>2.894</td>
<td>-2.103</td>
<td>-4.974</td>
<td>-16.891</td>
</tr>
</tbody>
</table>
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes

Develop our own model of a council to explain these findings

Project arrives and is characterized by female/male utilities ($u_w, u_m$).

Councilors incur cost $C(N_g)$ (strictly decreasing in $N_g$) to join committee and add $d$.

Random committee member chosen to make a motion to approve the project.

If majority votes in favor, councilors receive $U_g = u_g + \sum_j d_j$. Otherwise, councilors receive outside option $u_0$. 16
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)

- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)

- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes

Develop our own model of a council to explain these findings

- Project arrives and is characterized by female/male utilities \((u_w, u_m)\).
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes

Develop our own model of a council to explain these findings
- Project arrives and is characterized by female/male utilities ($u_w, u_m$).
- Councilors incur cost $C(N_g)$ (strictly decreasing in $N_g$) to join committee and add $\delta$. 
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes

Develop our own model of a council to explain these findings
- Project arrives and is characterized by female/male utilities \((u_w, u_m)\).
- Councilors incur cost \(C(N_g)\) (strictly decreasing in \(N_g\)) to join committee and add \(\delta\).
- Random committee member chosen to make a motion to approve the project.
Contextualizing empirical findings with stylized model

Comparison between results and classic story of “critical mass” (Kanter 1977)
- Consistent: Increase in women’s participatory behavior when representation crosses 15-30% threshold
- Not consistent: Women participate at all levels of representation, no clear evidence of changes in policy outcomes

Develop our own model of a council to explain these findings
- Project arrives and is characterized by female/male utilities \((u_w, u_m)\).
- Councilors incur cost \(C(N_g)\) (strictly decreasing in \(N_g\)) to join committee and add \(\delta\).
- Random committee member chosen to make a motion to approve the project.
- If majority votes in favor, councilors receive \(U_g = u_g + \sum_j D_j \delta_j\).
- Otherwise, councilors receive outside option \(u_0\).
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation:
- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one.
- No impact on participation beyond this threshold.
- Arising from costs of interacting when in extreme minority.

Effect on policy outcomes varies with gender gap in preferences:
- When $d(u_w, u_m)$ is large: consequential changes in voting patterns, topical content of motions brought to the floor, and the substantive content of public policy.
- When $d(u_w, u_m)$ is small: no impact on voting patterns, topical content of motions brought to the floor, or the substantive content of public policy.
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation
- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation
- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one
- No impact on participation beyond this threshold.
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation

- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one
- No impact on participation beyond this threshold.
- Arising from costs of interacting when in extreme minority
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation
- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one
- No impact on participation beyond this threshold.
- Arising from costs of interacting when in extreme minority

Effect on policy outcomes varies with gender gap in preferences
- When \( d(u_w, u_m) \) is large: Consequential changes in voting patterns, topical content of motions brought to the floor, and the substantive content of public policy.
Predicted effects of increasing female share on 5-member council

Behavioral effect on participation with increased representation
- Each woman participates on committees, and thus makes motions more often, when two women are present as opposed to only one
- No impact on participation beyond this threshold.
- Arising from costs of interacting when in extreme minority

Effect on policy outcomes varies with gender gap in preferences
- When $d(u_w, u_m)$ is large: Consequential changes in voting patterns, topical content of motions brought to the floor, and the substantive content of public policy.
- When $d(u_w, u_m)$ is small: No impact on voting patterns, topical content of motions brought to the floor, or the substantive content of public policy.
### Share of motions in given topic by gender

<table>
<thead>
<tr>
<th>Topic</th>
<th>Men's Share</th>
<th>Women's Share</th>
<th>Gender Gap</th>
<th>SE of Gap</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration</td>
<td>0.581</td>
<td>0.580</td>
<td>-0.002</td>
<td>0.008</td>
<td>0.846</td>
</tr>
<tr>
<td>Finance</td>
<td>0.206</td>
<td>0.219</td>
<td>0.014</td>
<td>0.007</td>
<td>0.035</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.100</td>
<td>0.092</td>
<td>-0.009</td>
<td>0.005</td>
<td>0.071</td>
</tr>
<tr>
<td>Property</td>
<td>0.183</td>
<td>0.175</td>
<td>-0.008</td>
<td>0.006</td>
<td>0.180</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>0.133</td>
<td>0.129</td>
<td>-0.004</td>
<td>0.005</td>
<td>0.503</td>
</tr>
<tr>
<td>Health</td>
<td>0.009</td>
<td>0.012</td>
<td>0.002</td>
<td>0.002</td>
<td>0.187</td>
</tr>
<tr>
<td>Parks</td>
<td>0.030</td>
<td>0.031</td>
<td>0.001</td>
<td>0.003</td>
<td>0.684</td>
</tr>
<tr>
<td>Libraries</td>
<td>0.005</td>
<td>0.005</td>
<td>0.000</td>
<td>0.001</td>
<td>0.814</td>
</tr>
<tr>
<td>Police</td>
<td>0.033</td>
<td>0.033</td>
<td>0.000</td>
<td>0.003</td>
<td>0.947</td>
</tr>
<tr>
<td>Airports</td>
<td>0.005</td>
<td>0.006</td>
<td>0.001</td>
<td>0.001</td>
<td>0.423</td>
</tr>
</tbody>
</table>
Conclusion

Find that nominal female representation does translate into substantive representation.
Conclusion

Find that nominal female representation does translate into substantive representation.
- Driven, in part, by behavioral effect on otherwise isolated women.
Conclusion

Find that nominal female representation does translate into substantive representation.
- Driven, in part, by behavioral effect on otherwise isolated women.

Mixed evidence on the importance of critical mass in this setting
- Classic theory holds up remarkably well with respect to female participation;
Conclusion

Find that nominal female representation does translate into substantive representation.
- Driven, in part, by behavioral effect on otherwise isolated women.

Mixed evidence on the importance of critical mass in this setting
- Classic theory holds up remarkably well with respect to female participation;
- But no evidence of policy changes even when crossing this threshold.
Conclusion

Find that nominal female representation does translate into substantive representation.
- Driven, in part, by behavioral effect on otherwise isolated women.

Mixed evidence on the importance of critical mass in this setting
- Classic theory holds up remarkably well with respect to female participation;
- But no evidence of policy changes even when crossing this threshold.

First estimates “in-the-wild” of effects previously documented in laboratory-type settings.
- Suggests lab results may extend to other consequential decision making processes.
Conclusion

Find that nominal female representation does translate into substantive representation.
- Driven, in part, by behavioral effect on otherwise isolated women.

Mixed evidence on the importance of critical mass in this setting
- Classic theory holds up remarkably well with respect to female participation;
- But no evidence of policy changes even when crossing this threshold.

First estimates “in-the-wild” of effects previously documented in laboratory-type settings.
- Suggests lab results may extend to other consequential decision making processes.

Suggests heterogeneity in gender gap in preferences might reconcile diverse findings from existing literature on women’s political representation
Questions or Comments Welcome!

Anna Weber  
anna.weber@westpoint.edu

Jesse Bruhn  
jesse_bruhn@brown.edu

Emilia Brito Rebolledo  
ebritore@brown.edu

Thea How Choon  
thewchoon@stlawu.edu