Technology and the Era of the Mass Army

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Motivation: The Conscription of Wealth

- What are the economic and political conditions that explain long-run trends in progressive taxation?
- One idea: mass warfare played a bigger role than democracy according to Scheve and Stasavage (2012, APSR) as well as Scheve and Stasavage (2010).
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What factors have determined the size of armies that great powers have fielded over time?

What factors have influenced the fraction of citizens that great powers have mobilized for war?
The Main Question(s) for This Paper

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Over the long run, changes in technologies for transport and communications have governed the size of armies that it has been feasible and desirable to mobilize.

We emphasize two technologies as being particularly important in the history of great power conflicts:
The Argument

- Over the long run, changes in technologies for transport and communications have governed the size of armies that it has been feasible and desirable to mobilize.
- We emphasize two technologies as being particularly important in the history of great power conflicts:
  - Transporting Men by Railway
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- Transporting Men by Railway
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Other Factors

- **State/Fiscal Capacity** - wealth and bureaucracy
- **Political Rights** - citizenship rights and extension of the suffrage
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Great power states and years in sample defined by Levy (1983). Includes Austria-Hungary (1600-1918), China (1949-2000), France (1600-2000), Italy (1861-1943), Japan (1905-1945), Netherlands (1609-1713), Ottoman Empire (1600-1699), Prussia/Germany/West Germany (1740-2000), Russia/Soviet Union (1721-2000), Spain (1600-1808), Sweden (1617-1721), United Kingdom (1600-2000), United States (1898-2000).
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War Mobilization Data, 1600-2000

Military Mobilization in United Kingdom

Year

Military Size, Thousands

Military Mobilization

Military Size (in Thousands)

Military Mobilization

1600 1700 1800 1900 2000

0 1000 2000 3000 4000 5000

0 0.02 0.04 0.06 0.08 0.1
War Mobilization Data, 1600-2000

and Settings/david.stasavage/Mes documents/Dropbox/Paris work/Mass army/Kenslides/russiasovietunionbasic2.pdf
<table>
<thead>
<tr>
<th>Century</th>
<th>Military Size</th>
<th>Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
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<tbody>
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<td>17th Century</td>
<td>Military Size</td>
<td>69</td>
<td>95.370</td>
<td>62.225</td>
<td>13.000</td>
<td>362.000</td>
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<tr>
<td></td>
<td>Military Mobilization</td>
<td>69</td>
<td>0.018</td>
<td>0.025</td>
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<td>18th Century</td>
<td>Military Size</td>
<td>152</td>
<td>179.559</td>
<td>102.351</td>
<td>12.725</td>
<td>732.474</td>
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<td>Military Mobilization</td>
<td>152</td>
<td>0.016</td>
<td>0.011</td>
<td>0.002</td>
<td>0.082</td>
</tr>
<tr>
<td>19th Century</td>
<td>Military Size</td>
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<td>324.011</td>
<td>11.134</td>
<td>2000.000</td>
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<td></td>
<td>Military Mobilization</td>
<td>80</td>
<td>0.017</td>
<td>0.009</td>
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<td>20th Century</td>
<td>Military Size</td>
<td>142</td>
<td>2762.583</td>
<td>2546.014</td>
<td>125.923</td>
<td>12500.000</td>
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<td></td>
<td>Military Mobilization</td>
<td>142</td>
<td>0.034</td>
<td>0.036</td>
<td>0.002</td>
<td>0.161</td>
</tr>
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</table>

Table: Military Size and Mobilization by Century, War Years.
## Methods of Recruitment, 1600-2000

<table>
<thead>
<tr>
<th>Country</th>
<th>Great power?</th>
<th>Conscription?</th>
<th>Universal?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1600-1918</td>
<td>1771-1918</td>
<td>1868</td>
</tr>
<tr>
<td>Italy</td>
<td>1861-1943</td>
<td>1861-1943</td>
<td>1907</td>
</tr>
<tr>
<td>Japan</td>
<td>1905-1945</td>
<td>1905-1945</td>
<td>1873</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1609-1713</td>
<td>no</td>
<td>never</td>
</tr>
<tr>
<td>Ottoman Empire</td>
<td>1600-1699</td>
<td>1600-1666</td>
<td>never</td>
</tr>
<tr>
<td>Prussia</td>
<td>1740-2000</td>
<td>1740-2000</td>
<td>1813</td>
</tr>
<tr>
<td>Russia</td>
<td>1721-2000</td>
<td>1721-2000</td>
<td>1874</td>
</tr>
<tr>
<td>Spain</td>
<td>1600-1808</td>
<td>1630-1645, 1704-1776</td>
<td>never</td>
</tr>
<tr>
<td>Sweden</td>
<td>1617-1721</td>
<td>1617-1682</td>
<td>never</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1600-2000</td>
<td>1916-1918, 1939-1960</td>
<td>1916</td>
</tr>
<tr>
<td>United States</td>
<td>1898-2000</td>
<td>1917-18, 1940-73</td>
<td>1917</td>
</tr>
</tbody>
</table>

**Table:** Military Recruitment
Sample. Pooled data includes all 443 country years for which we have data on military size and a great power country is at war.

Model. OLS regression of Military Size or Military Mobilization on country fixed effects and break points corresponding to potential factors influencing mobilization with country-clustered standard errors.
Pooled Data Break Points

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- **Model.** OLS regression of *Military Size* or *Military Mobilization* on country fixed effects and break points corresponding to potential factors influencing mobilization with country-clustered standard errors.

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>$D_{1789}$</td>
<td>-23.930</td>
<td>0.003</td>
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<tr>
<td></td>
<td>(138.442)</td>
<td>(0.002)</td>
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<tr>
<td></td>
<td>0.866</td>
<td>0.263</td>
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<tr>
<td>$D_{1859}$</td>
<td>2030.983</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>(545.037)</td>
<td>(0.004)</td>
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<tr>
<td></td>
<td>0.003</td>
<td>0.000</td>
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<tr>
<td>$D_{1970}$</td>
<td>-1166.186</td>
<td>-0.020</td>
</tr>
<tr>
<td></td>
<td>(448.374)</td>
<td>(0.006)</td>
</tr>
<tr>
<td></td>
<td>0.023</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Country Fixed Effects: Yes
Number of Observations: 443

Table: *Military Size and Mobilization in Great Power Wars, 1600-2000.*
Sample. Pooled data includes 443 country years for which we have data on military size and a great power country is at war.

Model. OLS regression of Military Size or Military Mobilization on country fixed effects; break points corresponding to potential factors influencing mobilization; direct measures of railroad expansion, cruise missile development with country-clustered standard errors.
Pooled Data - No Controls

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Railways. Railroad Track is equal to the length of the railroad track available to the public in each country measure in kilometers.

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<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
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<tr>
<td><strong>D1789</strong></td>
<td>96.674</td>
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<tr>
<td></td>
<td>(83.746)</td>
<td>(0.002)</td>
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<tr>
<td></td>
<td>0.271</td>
<td>0.135</td>
</tr>
<tr>
<td><strong>D1859</strong></td>
<td>219.159</td>
<td>0.012</td>
</tr>
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<td>(477.470)</td>
<td>(0.004)</td>
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<td>0.654</td>
<td>0.012</td>
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<td><strong>D1970</strong></td>
<td>353.256</td>
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<td>(339.786)</td>
<td>(0.004)</td>
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<td>(271.825)</td>
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<tr>
<td><strong>Country Fixed Effects</strong></td>
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<td>Yes</td>
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**Fiscal capacity.** *GDP per capita* as proxy. Also used variable coded based on date of first census.
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**Pooled Data - With Controls - Results**

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Evidence of significant correlation between Democracy and Military Mobilization. Little evidence of correlation between GDP per capita and Military Mobilization.
Was it Just the Two World Wars?

- There could have been many factors common to each or both that might bias the result
- Remove WWI - Results stay basically the same (RR coefficient 20% lower in magnitude)
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Other Robustness Tests

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- Alternative measures of fiscal capacity—*Census, Taxes, Spending*
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- When governments had security concerns, they usually nationalized rather than built new track (Bogart, 2009).
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Further Evidence from Conscription Regimes

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Nine Years' War
War of Austrian Succession
Revolutionary Wars
Napoleonic Wars
Franco-Prussian War
WWI
WWII
17th century time of dramatic growth in French army and mobilization—362k men in Nine Years’ War suggests a roughly 8x increase over the century.

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Military Mobilization in France–Key Patterns

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We argue that states will only raise mass armies if they have the means to transport, supply, and command the armies that they raise and if large armies constitute the most effective means for achieving their security objectives.
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