The Effect of WWI Military Casualties on the Population Distribution in Germany

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Roadmap

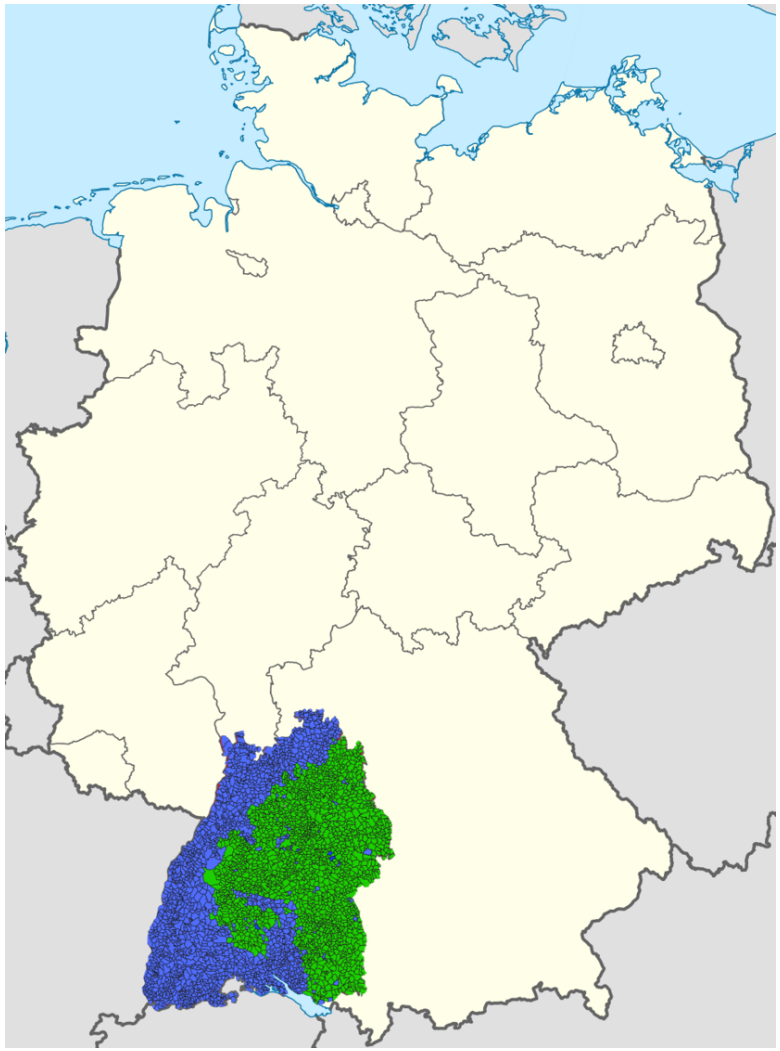
- Auerbach 1913, Lotka 1925, Zipf 1949, and others since: city size distributions seem to satisfy certain statistical regularities
- Simon 1955: scale-invariant random growth may explain regularities
- economics of scale-invariant random local growth: Gabaix 1999, Duranton 2006, Rossi-Hansberg and Wright 2007, Cordoba 2008
- want to contribute evidence on persistence of local population shocks, using data on German military casualties in WWI (1914-1918)

Roadmap

- scale-invariant city population growth in US: Glaeser, Scheinkman, Shleifer 1995, Eaton and Eckstein 1997, Black and Henderson 2003, Ioannides and Overman 2003, Eeckhout 2004
- effects of allied aerial bombing in WWII: Davis and Weinstein 2002, Brakman, Garretsen, and Schramm 2004 (Glaeser and Gyourko 2005 on role of housing supply for urban growth)
- Bleakley and Lin 2012: persistent effects of geographic productivity advantages long after these vanished

Roadmap

Map of Württemberg 1806-1945, within Germany today



Why Württemberg?

- exceptional pre-WWI 1898 and 1910 compendia of municipality statistics
- no relevant material destruction during WWI
- few changes in municipality borders up to 1970 (concentrated 1933-39)

Some variables from 1910 statistical compendium

population 1905	income per capita 1905
number of households 1905	agricultural relative to total population 1905
male relative to female population 1905	daily wage 1884
population density 1905	growth daily wage 1884-1909
male population growth 1905-1910	share male population younger 14 in 1875
male population growth 1900-1905	share male population younger 14 in 1880
male population growth 1880-1900	share female population younger 14 in 1875
female population growth 1905-1910	share female population younger 14 in 1880
female population growth 1900-1905	share population younger 14 in 1895
female population growth 1880-1900	nonagricultural businesses per capita 1907/1905
nonagricultural businesses per capita 1907/1905	male population born in municipality relative to total male population 1895
nonagricultural business taxes per capita 1908/1905	female population born in municipality relative to total female population 1895
property tax per capita 1907/1905	distance next train station
property tax per building 1907	labour force to total population 1905
land tax per square km 1907	share of farms below 2 hectars
fire insurance buiding values per capita 1908/1905	share of farms between 4 and 10 hectars
nonagricultural business employment per business 1907	share of farms between 10 and 20 hectars
stillborn or died younger than 1 year old relative to all births 1896-1905	share of farms larger than 20 hectars
population born in municipality relative to total population 1900	growth in land area of municipality 1905-1933
population born in municipality relative to total population 1895	

Roadmap

Estimating equations: first-stage (1910-1919)

$$\textit{male population growth}^{1919}_{c,1910} = \gamma \left(\frac{\textit{WWI casualties}_c}{\textit{population}_c} \right) + \delta X_c + \eta^{1919}_{c,1910}$$

Estimating equations: reduced-form second-stage (1910-1933)

$$male\ population\ growth^{1933}_{c,1910} = \lambda \left(\frac{WWI\ casualties_c}{population_c} \right) + \kappa X_c + \eta^{1933}_{c,1910}$$

Estimating equations: second-stage (1910-1933)

$$population\ growth^{1933}_{c,1910} = \phi\left(male\ population\ growth^{1919}_{c,1910}\right) + \mu X_c + \eta^{1933}_{c,1919}$$

$$\Uparrow$$

instrument: WWI casualties

Roadmap

Roadmap

1. Introduction
2. Related Literature
3. Data
4. Empirical Framework
5. Empirical Results
   - Reduced-form evidence using binscatter plots
   - Effects in 1919 and 1933
   - Effects in 1939, 1950, and 1960
6. Conclusion

Figure 1: Effect of WWI casualties on male population growth 1910-1919

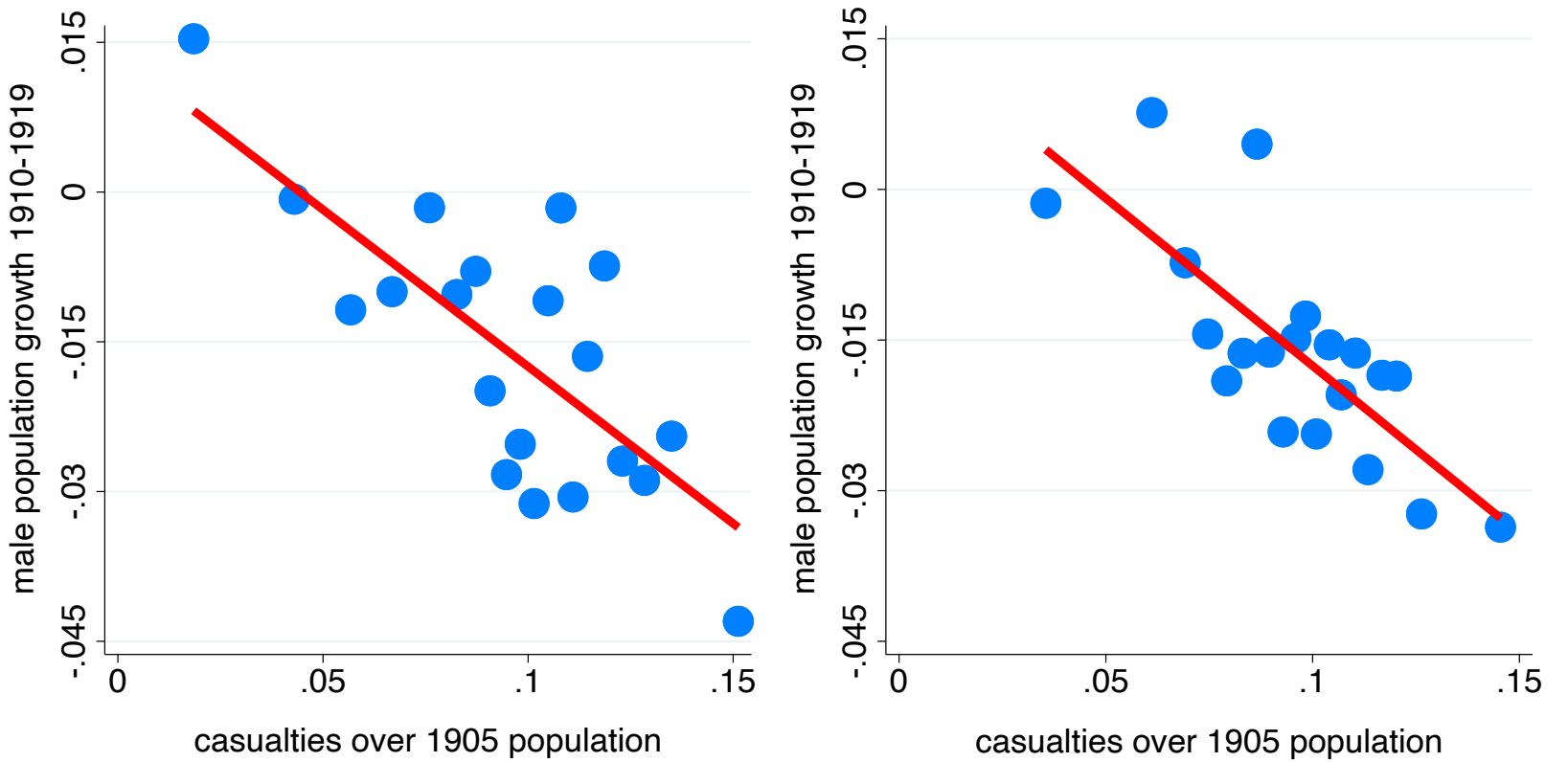


Figure 2: Effect of WWI casualties on male population growth 1900-1910

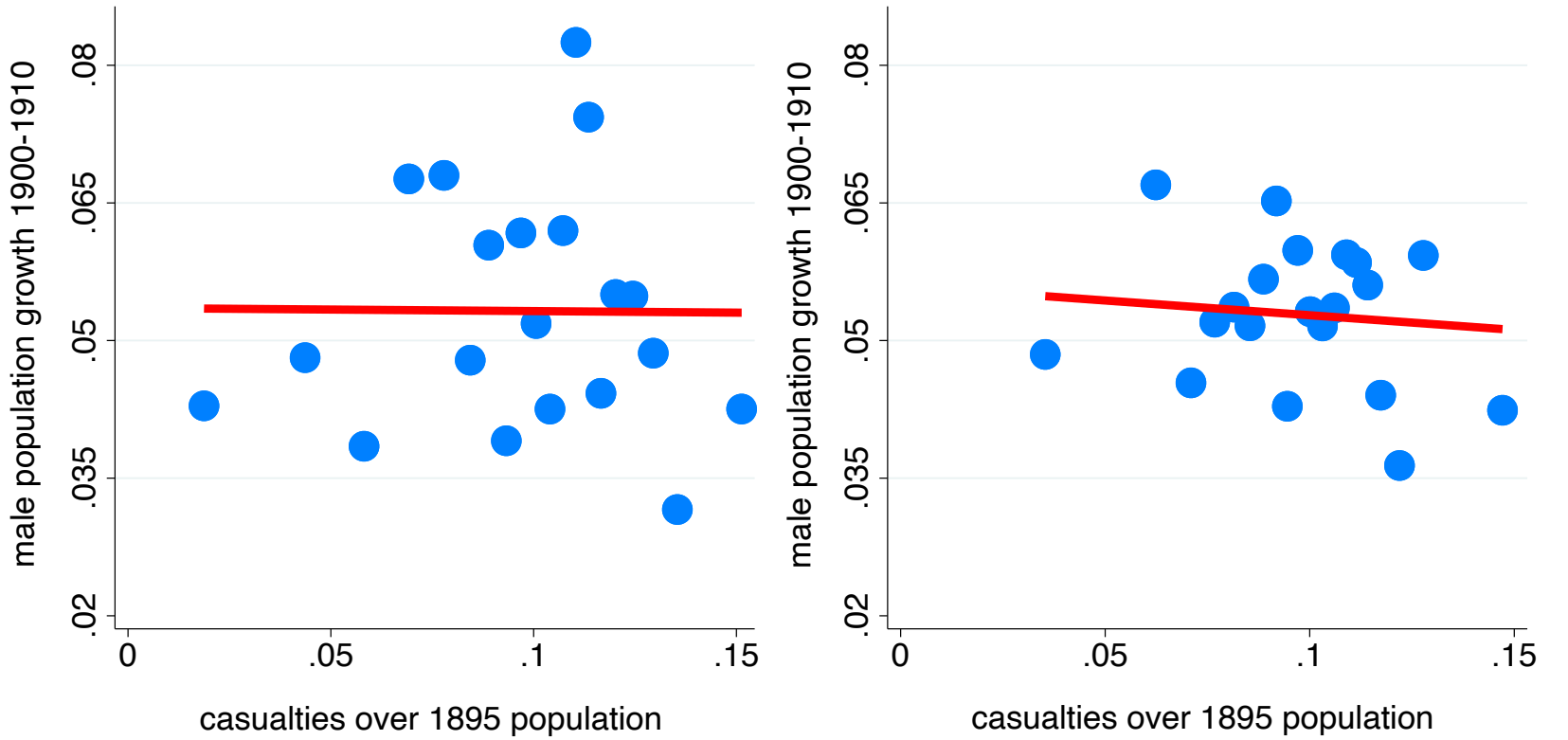


Figure 3: Effect of WWI casualties on male population growth 1910-1933

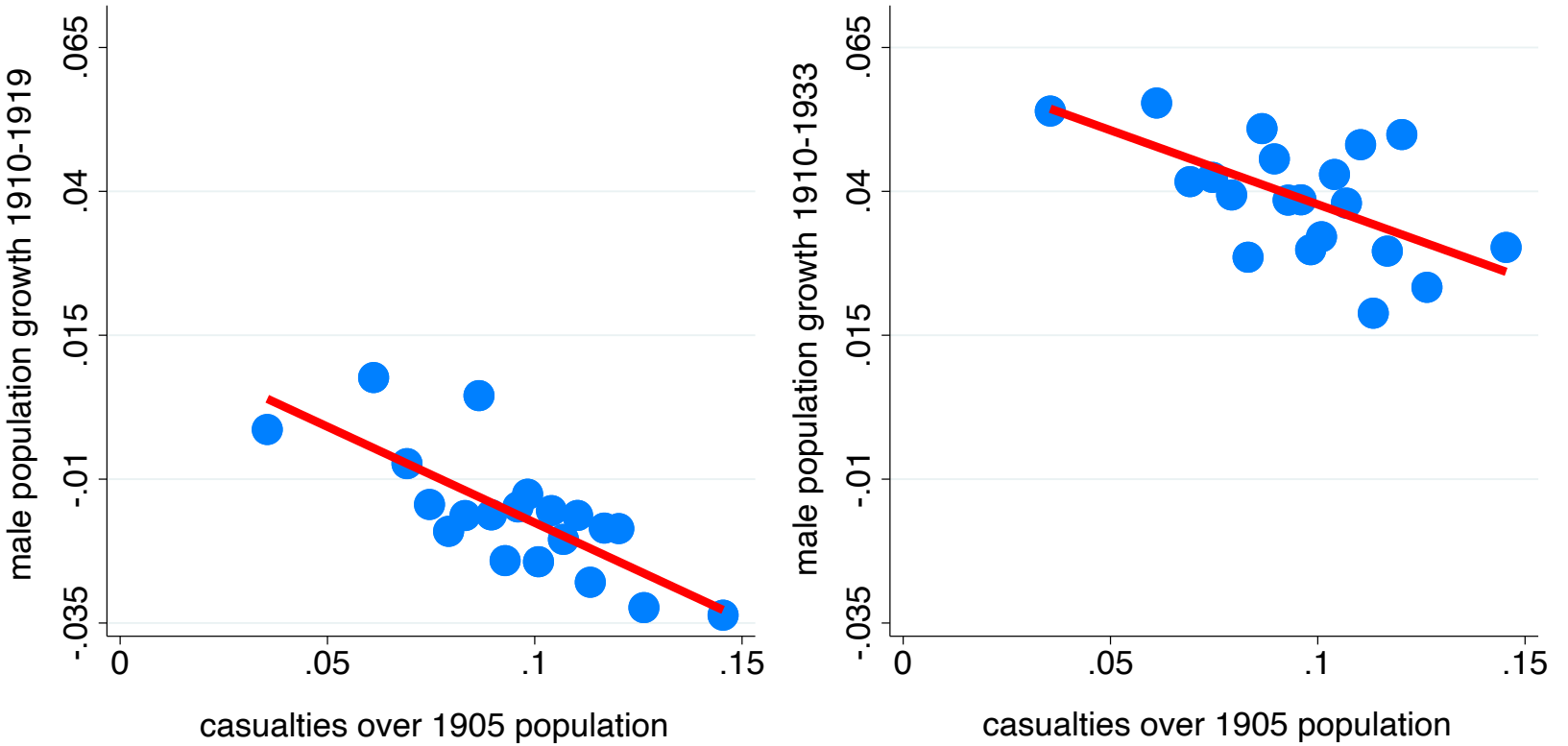


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Figure 4: Male Population Growth 1910-1919

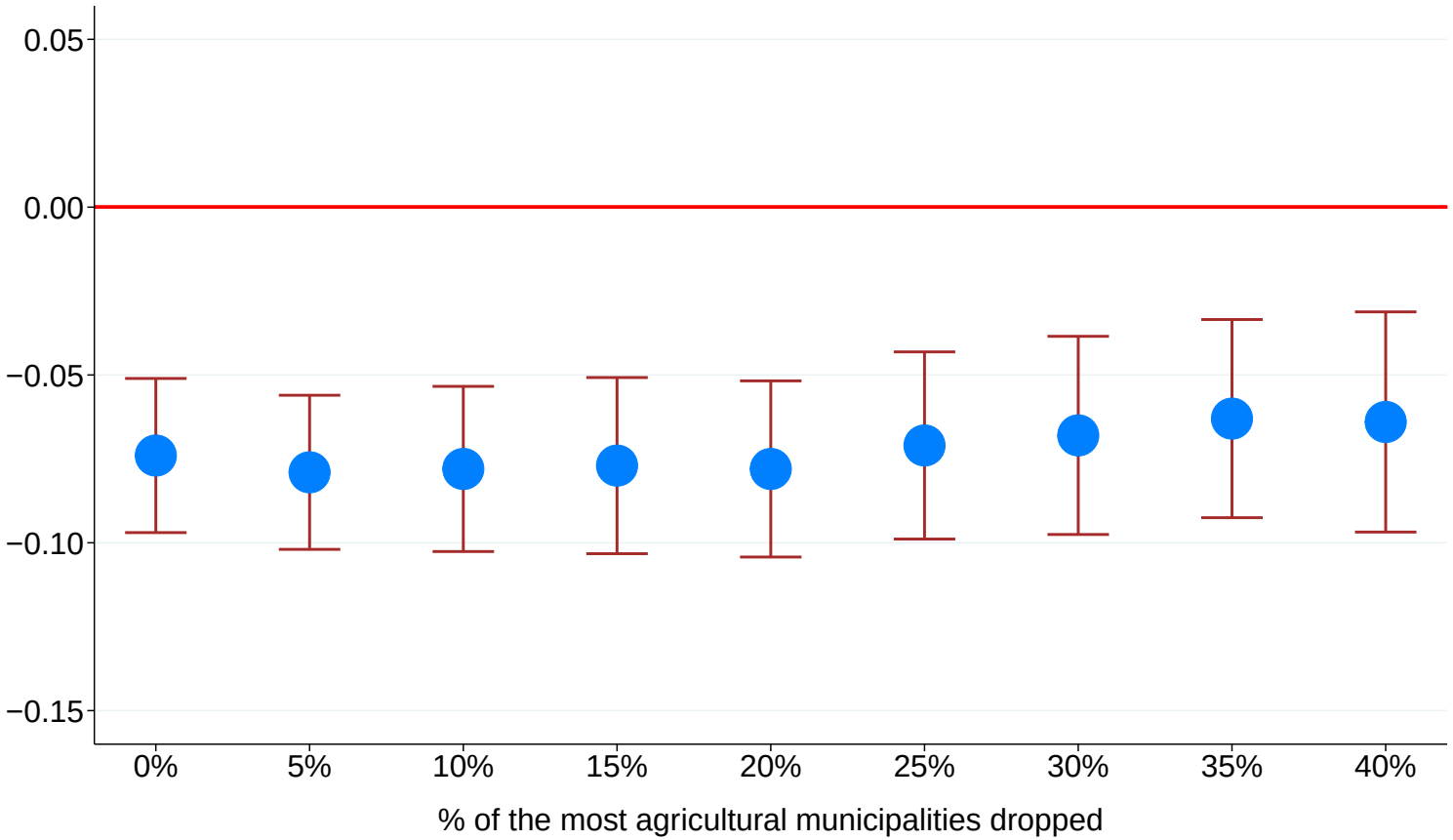

Figure 5: Male Population Growth to 1933

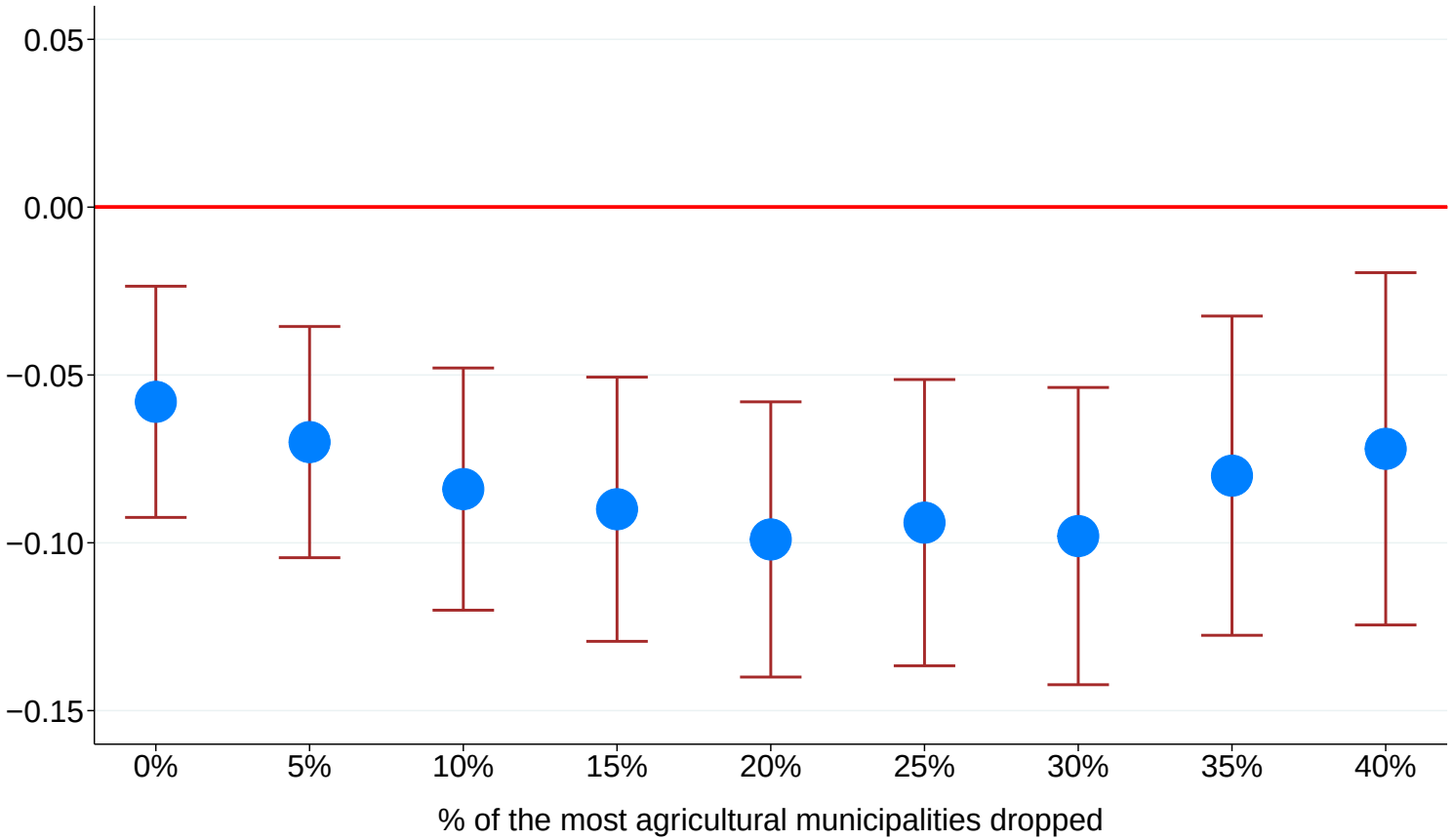

Figure 6: Persistence to 1933

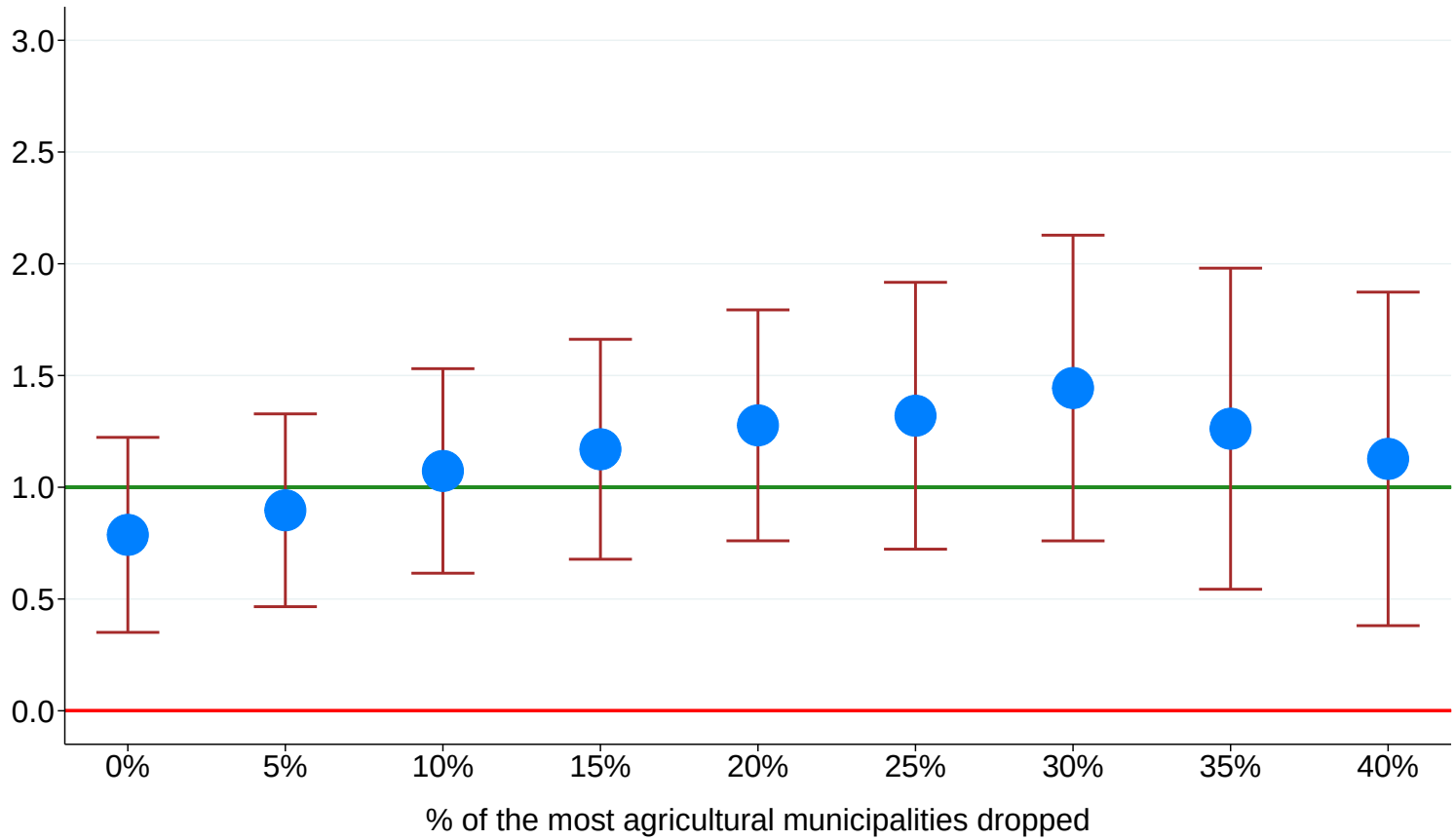

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Figure 7: Male population growth to 1939

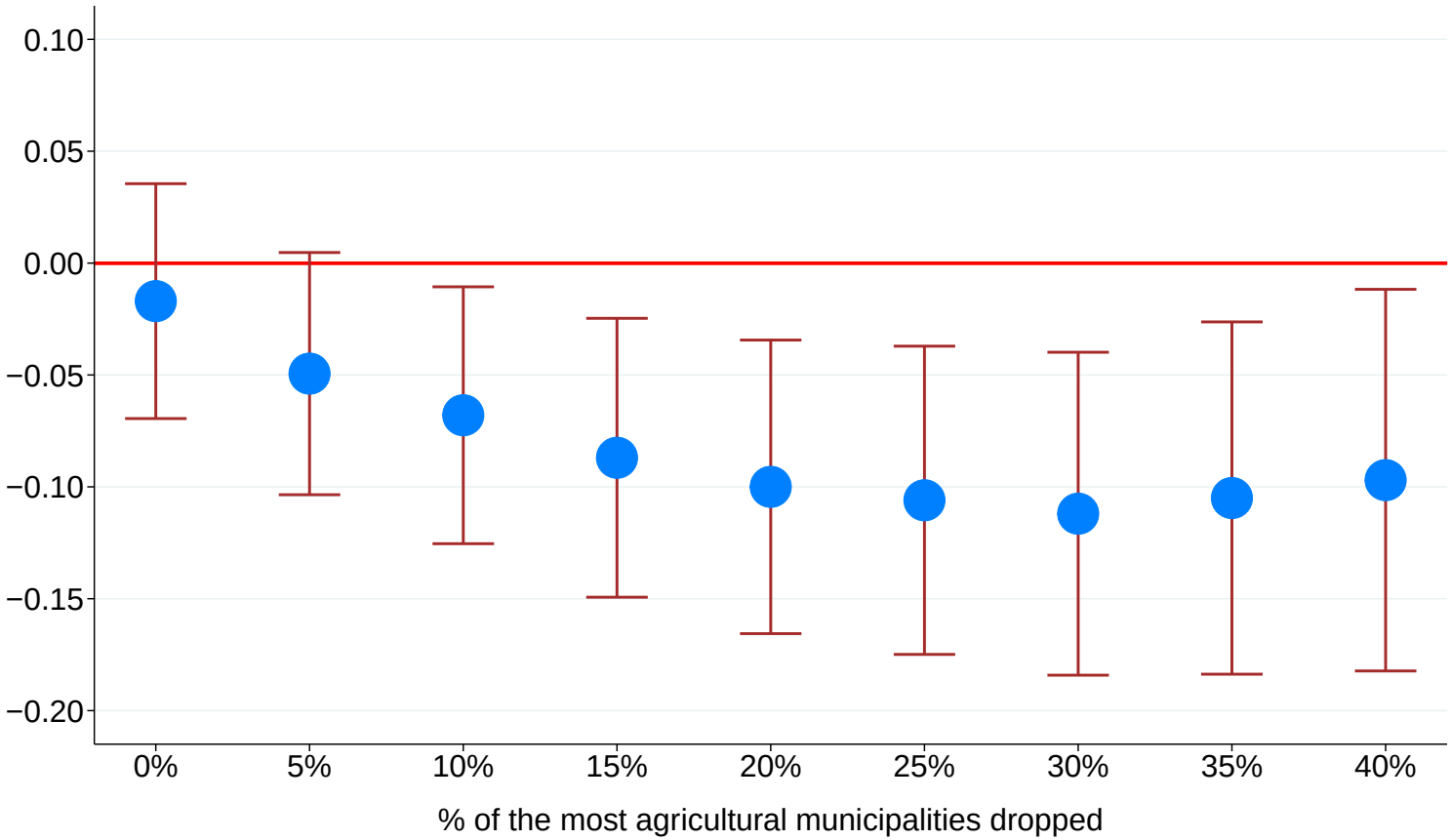


Figure 8: Male and female population growth to 1950

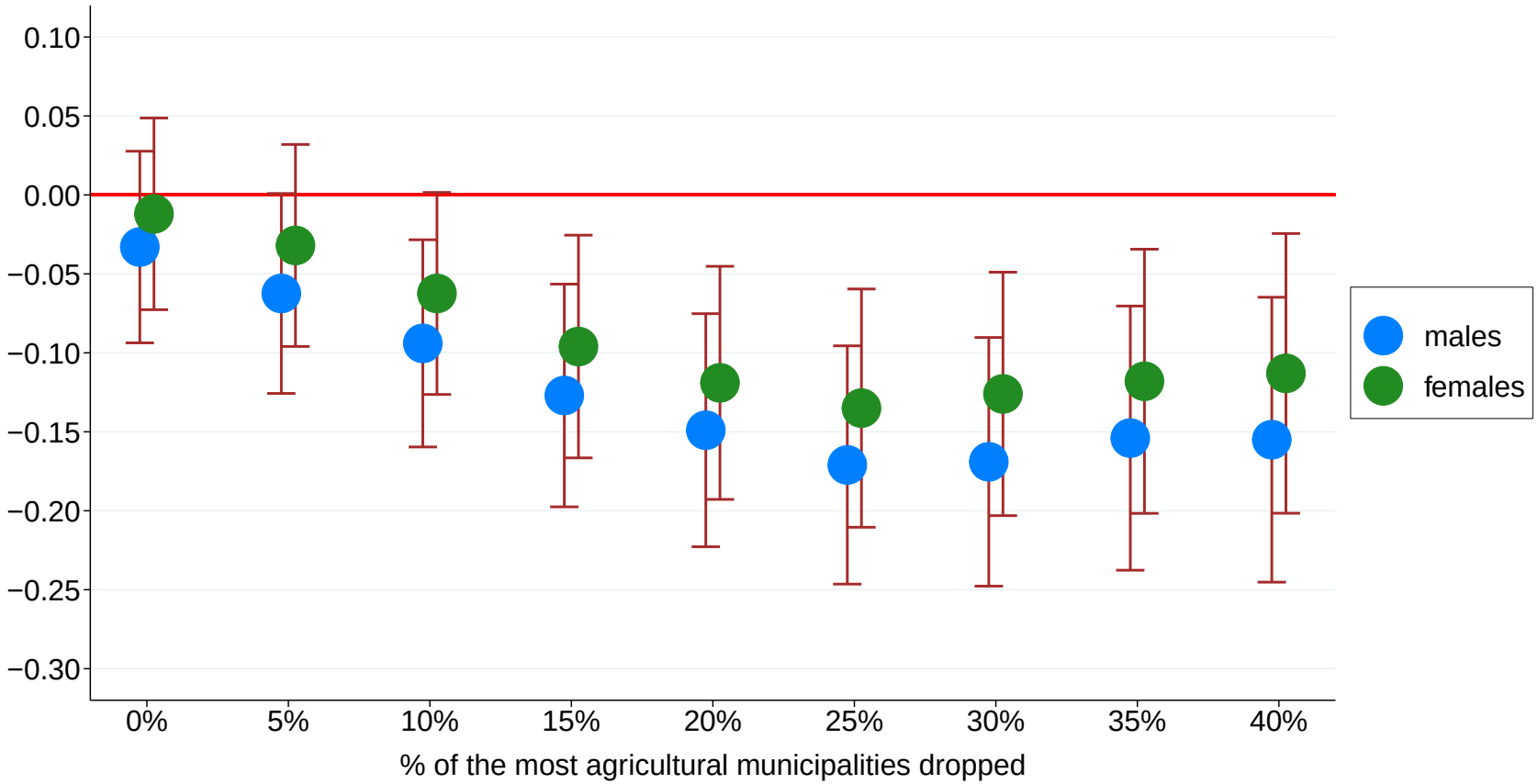
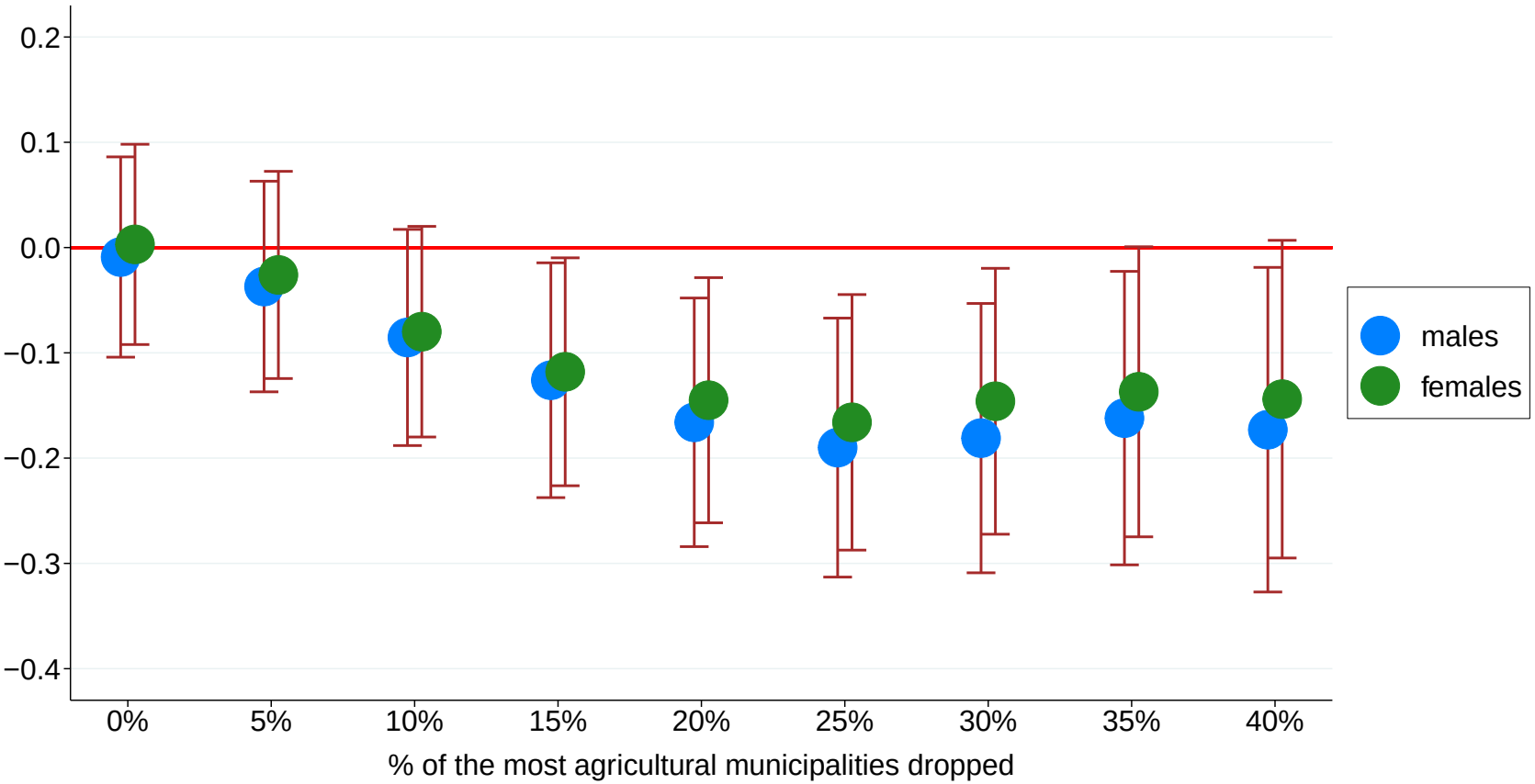


Figure 9: Male and female population growth to 1960



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Conclusion

- evidence that local population shocks are persistent
- especially where agricultural land not major economic factor