FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION

MACROECONOMICS, POLICY AND ECONOMETRICS

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SPANISH FLU IN 1918:

MACROECONOMIC RISK ACROSS THE GLOBE

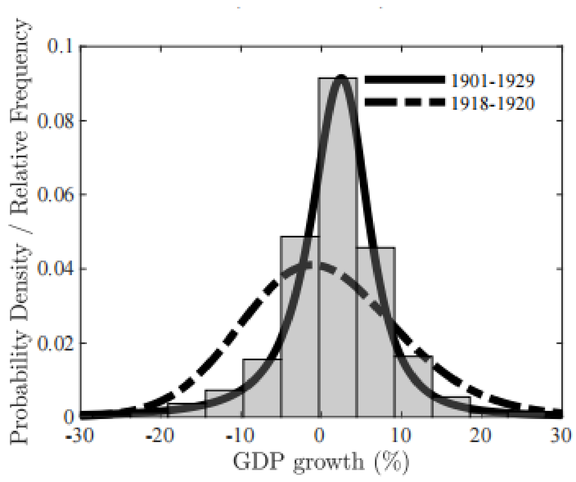
What

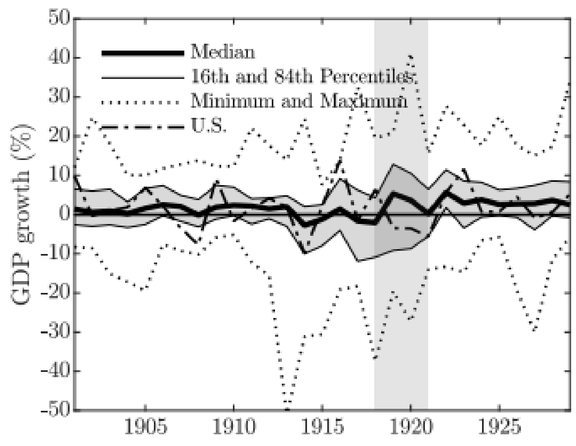
Spanish flu (1918-1920)

- 2% of world population died
- Estimate its economic impact
- Expected values vs. Risk

Extension of Barro (2020)

- 42 countries
- Yearly data: 1901-1929
- GDP, flu death rate, war death rate





Results

	Average GDP loss	Macroeconomic risk	Cross-country inequality
Barro (2020)'s linear model	6%	?	?
Our non-linear model	7%	↑↑	↑

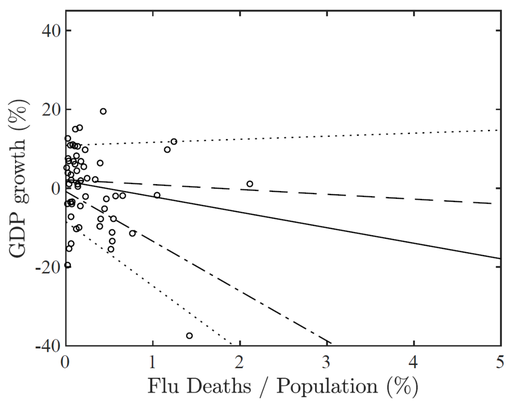
Flu death rate regressions (control for war deaths)

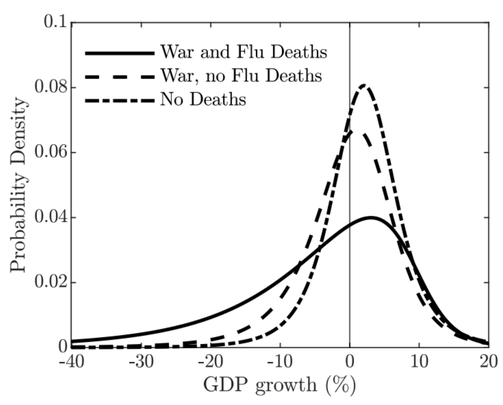
OLS $$\Delta GDP_{it} = \alpha + \beta\, Flu_{it} + \epsilon_{it}$$

QR $$Q_\tau(\Delta GDP_{it}) = \alpha(\tau) + \beta(\tau)\ Flu_{it} + \epsilon_{it}(\tau)$$

Estimation

Quantile regression & skew-t densities (Adrian et al. 2019)





1. Do quantile regressions for cond. density of GDP growth
2. Take each country's death rate on x-axis
3. Each QR-coeff shows GDP growth rate for that quantile
4. Pick a probility distribution: skew-t
5. "Interpolate" the four quantiles into skew-t

Partial effect

Impact on expected growth

$$E(x) = \int_{-\infty}^{+\infty} x \cdot p(x)$$

$$\sum_{i=1}^{N} \sum_{t=1918}^{1920} E(\Delta GDP_{it}|NoFlu_{it}) - E(\Delta GDP_{it}|Flu_{it})$$

1918 (% growth)	$E(\Delta GDP_{it}\|Flu_{it})$	$E(\Delta GDP_{it}\|NoFlu_{it})$	Impact
Argentina	1,56	2,11	-0,55
Austria	-12,31	-9,67	-2,64
Belgium	-0,29	2,11	-2,4
United States	-0,36	0,98	-1,34
…			
Global	-4,87	-0,18	-4,89

Impact on risk

$$SF_{10\%}(x) = \int_{-\infty}^{F^{-1}(10\%)} x \cdot p(x)$$

$$\sum_{i=1}^{N} \sum_{t=1918}^{1920} SF_{10\%}(\Delta GDP_{it}|NoFlu_{it}) - SF_{10\%}(\Delta GDP_{it}|Flu_{it})$$

1918 (% growth)	$SF_{10\%}(\Delta GDP_{it}\|Flu_{it})$	$SF_{10\%}(\Delta GDP_{it}\|NoFlu_{it})$	Impact
Argentina	-11,57	-8,91	-2,66
Austria	-50,81	-38,69	-12,12
Belgium	-20,09	-8,91	-11,18
United States	-18,11	-11,90	-6,21
…			
Global	-35,93	-14,87	-21,06

Inequality

Cross-country heterogeneity

Dummy for below-median level of GDP in 1917

- Lower-income countries suffered most
- But this is mostly due to higher death rates
- Rather than more adverse transmission

Takeaways

- Spanish flu was bad….
- … but macroeconomic risk was enormous
- Partial effect derived from flexible conditional densities
- Country heterogeneity

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