Health for nothin' and the trade for free - That ain't workin' ?!

On the consequences of health on trade

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Outline

An interesting topic...

Figure 1: Exports and Health

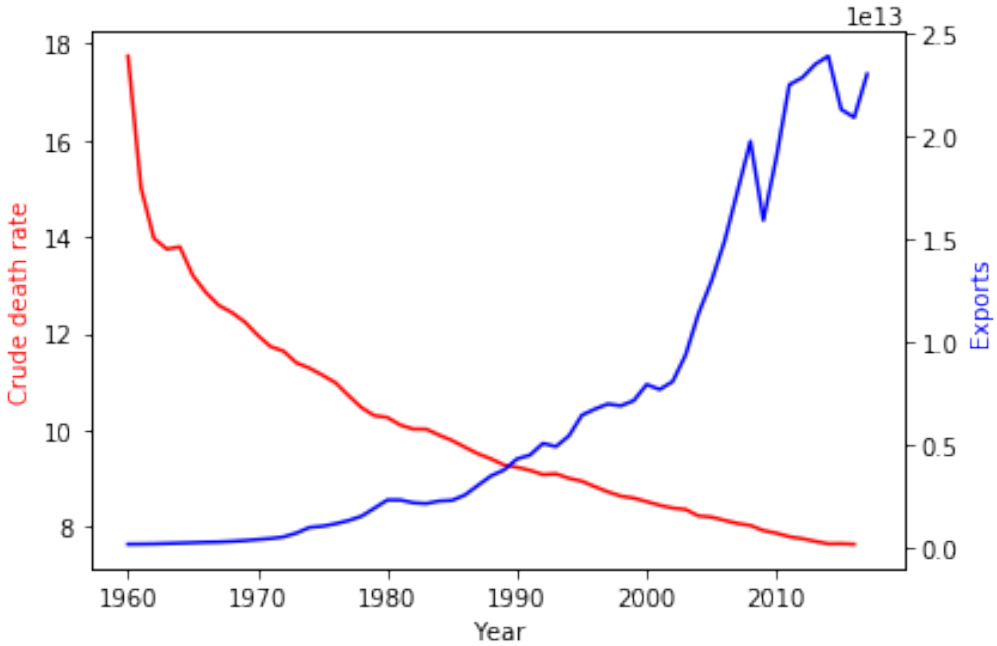


Figure 1 shows time trends of the crude death rate of the world (red) and the aggregated world exports (blue).
The left scale measures the crude death rate per 1000,
while the right scale total exports in 2010 dollars. Both are measure are annual.

The Environment

The intermediate producers

$$a_t + a_t^* = A_t N_t^{1-\alpha} K_{t-1}^{\alpha} \tag{1}$$

$$b_t^* + b_t = A_t^* N_t^{*1-\alpha} K_{t-1}^{*\alpha} \tag{2}$$

The final producers

$$(\omega a_t^{\frac{\theta-1}{\theta}} + (1-\omega) b_t^{\frac{\theta-1}{\theta}})^{\frac{\theta}{\theta-1}} \tag{3}$$

$$((1-\omega) a_t^{*\frac{\theta-1}{\theta}} + \omega b_t^{*\frac{\theta-1}{\theta}})^{\frac{\theta}{\theta-1}} \tag{4}$$

The resource constraints

$$K_t - (1-\delta) K_{t-1} + C_t = (\omega a_t^{\frac{\theta-1}{\theta}} + (1-\omega) b_t^{\frac{\theta-1}{\theta}})^{\frac{\theta}{\theta-1}} \tag{5}$$

$$K_t^* - (1-\delta) K_{t-1}^* + C_t^* = ((1-\omega) a_t^{*\frac{\theta-1}{\theta}} + \omega b_t^{*\frac{\theta-1}{\theta}})^{\frac{\theta}{\theta-1}} \tag{6}$$

Decentralized Solution

Shocks occur to health

$$H_t = \rho^H H_{t-1} + \epsilon_{t-1} \tag{7}$$

which enters via

$$\ln A_t = \rho^A \ln A_{t-1} + H_t \tag{8}$$

$$\ln N_t = \rho^N \ln N_{t-1} + H_t \tag{9}$$

Further note, the real exchange rate for the home country

$$rer_t = \frac{qa_t}{qa_t^*} \tag{10}$$

and the home country's trade balance

$$nx_t = q_{a,t} a_t^* - q_{b,t} b_t \tag{11}$$

Simulation

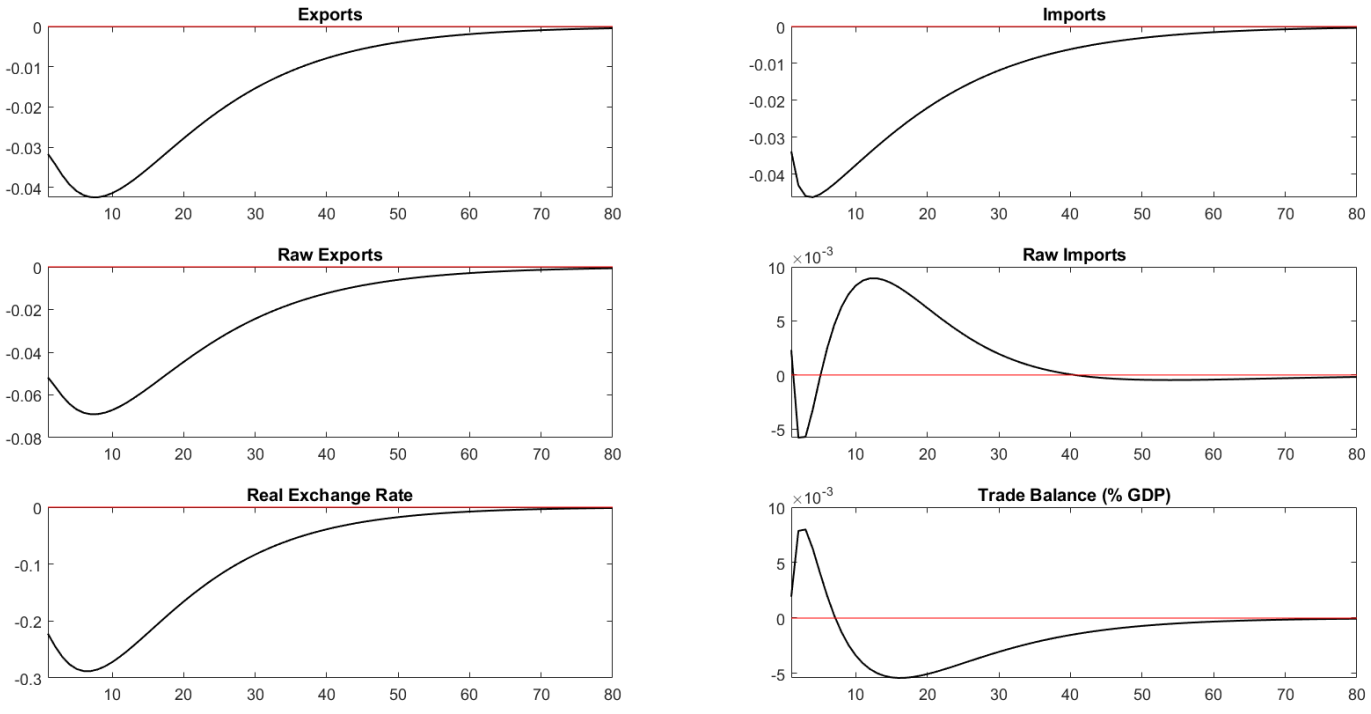


Figure 2: Simulation.

Measuring Ebola

Overall sample properties

- Covers 40 countries in Sub-Saharan Africa
- For the years 2000 until 2016

I consider two main measures

- Case Prevalence Rate
- Ebola Articles in NYT

Other Data

- Ebola Data from the *WHO Situation reports*.
- Health is measured in adult, age-adjusted mortality rates from the *World Bank Development Indicators*.
- Measures of trade include the logarithms of exports and imports as well as the trade balance (in % of GDP). Data is taken from *IMF Directions of Trade* dataset

Estimation Strategy

In essence, my estimation strategy relies on a difference-in-differences to receive predicted mortality rates. The (exogenous), predicted mortality rates work as an instrument for health to identify a causal mechanism of health on trade.

$$Y_{ijt} = \beta \mathbf{H_{it}} + X'_{ijt}\eta + \alpha_{ij} + \zeta_t + \epsilon_{ijt} \tag{12}$$

with

$$\mathbf{H_{it}} = \beta Z_{it} + Q'_{it}\nu + X'_{it}\eta + \pi_{it} + \alpha_i + \zeta_t + \epsilon_{it} \tag{13}$$

Figure 3: Pre-trends

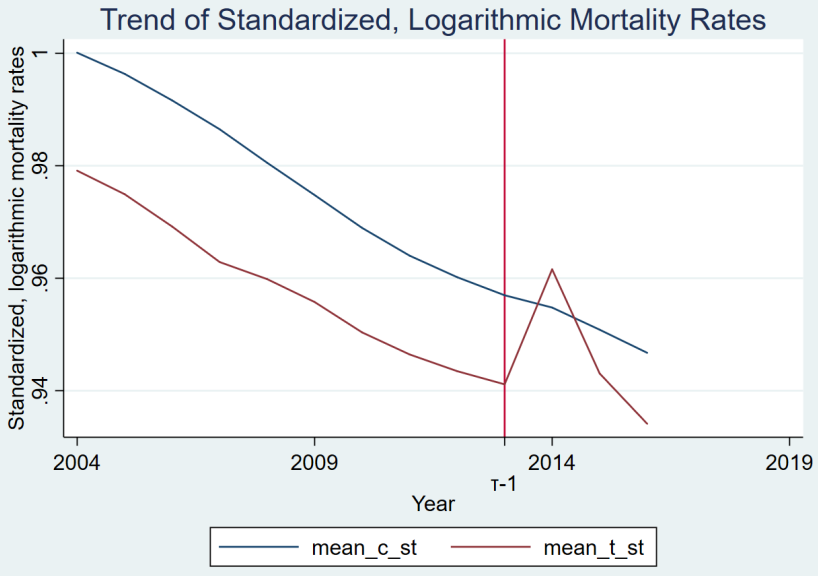
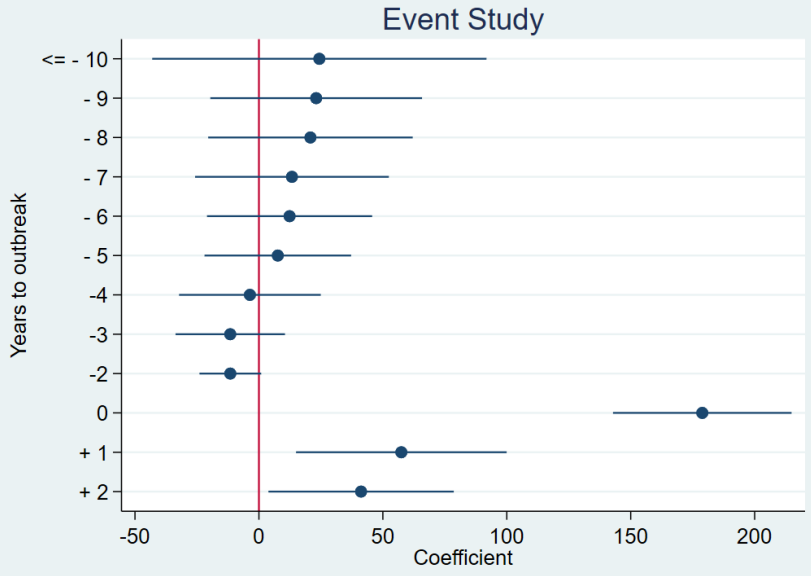


Figure 4: Event Study



First Stage Results

Table 1: First stage results

Dependent Variable	Log Adult Mortality Rate	
Log Prevalence Rate	0.9716***	
	(0.3169)	
Log Ebola Articles		0.0203***
		(0.00389)
Linear Trend	-0.0236***	-0.0238***
	(0.00267)	(0.00270)
Observations	124,117	124,117
Number of country-pairs	7,301	7,301
Two-way FE	Yes	Yes
Cluster level	Country pair	Country pair
F-statistic	39.60	69.58

Log Prevalence Rate is the log of the number of infected divided by the total population
Log Ebola Articles is the log of the number NYT articles about Ebola and a country
Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Clustered Standard Errors

Table 2: Wild cluster bootstrap

	(I)		(II)	
Treatment group	Three countries		Three countries	
Treatment variable	Case prevalence		Ebola articles	
Estimate	0.9716		0.02	
Cluster robust s.e.	0.3169		0.004	
t-statistic	3.07		5.21	
P-values & CI	P value	CI	P value	CI
Initial results	0.004	[0.331, 1.613]	0.000	[0.012, 0.028]
Bootstrap by country, restricted	0.105	[-631.6, 24.2]	0.1054	[-.1698, .2974]
Bootstrap by country, unrestricted	0.28	[-.461, 2.404]	0.0000	[.01224, .02828]
Bootstrap by country-pair, restricted	0.0856	[-1.649, 5.502]	0.009	[.009949, .03193]
Bootstrap by country-pair, unrestricted	0.1381	[-.5862, 2.529]	0.000	[0.012, 0.028]

Baseline Results

Table 3: Second Stage Baseline

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Exports		Imports		Trade Balance (% GDP)	
Log Mortality Rate	-3.1353***	-3.179***	0.0591	0.0649	0.0172	0.0173
	(0.673)	(0.675)	(0.0499)	(0.0494)	(0.0134)	(0.0141)
Log GDP p.c.					0.0067	0.0067
					(0.0091)	(0.0092)
Instrument	Prevalence	Articles	Prevalence	Articles	Prevalence	Articles
Observations	57,794	57,794	64,203	64,203	81,872	81,872
Two-way FE	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic first stage	34.53	47.49	41.77	58.36	27.95	35.64
No. of clusters	40	40	40	40	38	38
Cluster	Country pair					

Clustered standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Impulse Response Functions

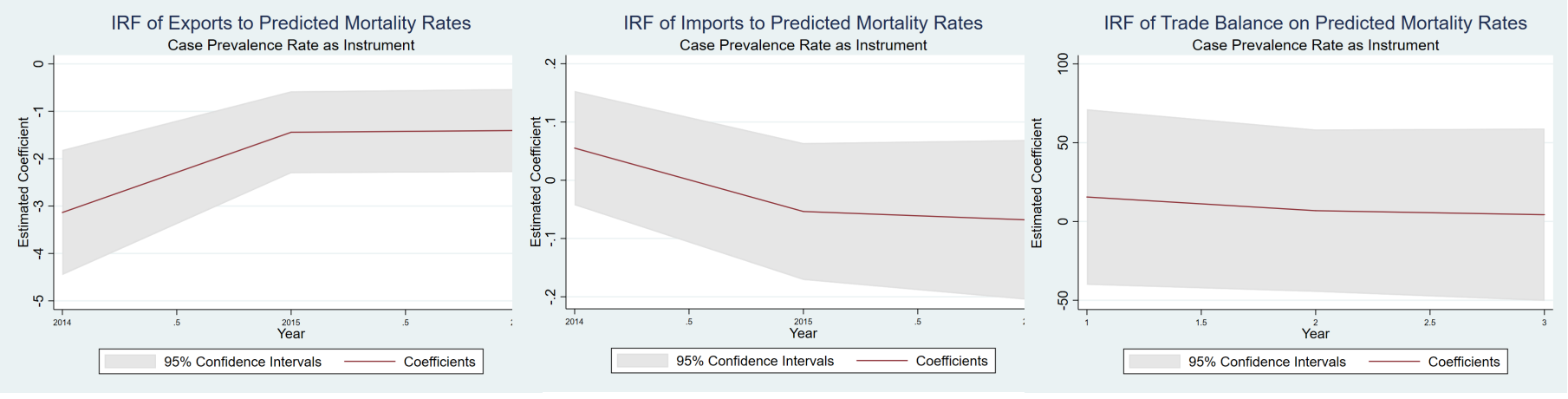


Figure 5: Second Stage IRF

Let's wrap it up

- An increase in the Ebola prevalence rate by 1 % cause mortality rates to climb by 1% to 1.5%.
- Increase in mortality rates by 1% can be associated with a reduction of exports by between 2% and 3 %.
- Likely no impact on imports or trade balance.
- Micro-approach to investigate the exact mechanism
- Longer time horizon.
- To policy-makers: Effective spending on health to increase exports, potentially, threefold.