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Economics 400: Econometrics

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Lab III

1. Traditional economic theory argues that globalization and expanding trade serve to increase comparative advantage, increasing global economic outcomes. Critics of globalization, however, argue that globalization is harming the poor, as the benefits of trade are being concentrated by those who control the trade. The issue of free trade is a pressing one because as globalization expands, and the U.S. continues to engage in trade agreements in Asia and Europe (The Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership, respectively), objections to this movement may increase. It is important to ensure that the agreements we make for free trade are affecting all parties positively. To determine this, Owen and Wu examine health outcomes in a nation, which serves as a proxy for general welfare. They argue that trade affects health outcomes through three channels: a knowledge channel, where nations share knowledge of best health practices; a products channel, where medical goods and devices trade across nations; and an environmental channel, which suggests that increased trade and, by extension, industrialization leads to greater pollution, which reduces health outcomes.
2. The variables are detailed in table 1, shown below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Obs | Mean | Std. Dev | Min | Max |
| *Year* | 390 | 4.5 | 1.710 | 2 | 7 |
| *School* | 390 | 44.285 | 29.507 | 1 | 119.5 |
| *Morti* | 390 | 64.999 | 47.419 | 4.6 | 199.8 |
| *GDP* | 390 | 4297.444 | 4011.341 | 341 | 17173 |
| *Open* | 390 | 67.190 | 51.298 | 10.337 | 439.029 |
| *Popgrow* | 390 | -4.108 | .827 | -8.407 | -3.14 |

*Table 1: Summary Statistics*

*Year* represents the year of the analysis, and allows us to create time-series for analysis. The mean of 4.5 also tells us that the spread of years is evenly balanced.

*School* is the percentage of secondary school enrollment in each country at each time. The low standard deviation suggests a relatively condensed range of enrollments.  
*Morti* is infant mortality per 1000 births. The low standard deviation suggests a relatively condensed range of mortality rates.

*GDP* is the real GDP per capita. The high standard deviation suggests a relatively loose range of GDP levels.

*Open* is a measure of national openness to trade, quantified as the amount of trade (exports + imports) as a percent of GDP. The relatively high standard deviation suggests a relatively wide range of openness to trade.

*Popgrow* is a measurement of population growth over time for each nation. This variable is in logarithmic form.

The difference between a pooled cross-section model and a fixed effects model is that the pooled cross-section model does not account for the time-constant differences between countries, which could bias the estimators. It also fails to account for possible time trends.

1. The results are displayed below; robust standard errors are in parentheses

|  |  |  |  |
| --- | --- | --- | --- |
|  | Model 1 | Model 2 | Model 3 |
| Ln(GDP) | -4.01673 (6.528955) | -15.62391 (11.84011) | -18.6277\* (11.22512) |
| Ln(Open) | 32.74668\*\*\* (12.65987) | -20.5811 (16.9785) | -41.47978\*\*\* (15.35969) |
| Ln(GDP)\*Ln(Open) | -4.343944\*\*\* (1.449511) | 1.939349 (2.299753) | 5.080965\*\* (2.070085) |
| Ln(Popgrowth) | 2.228409\*\* (1.081544) | 1.38841 (1.228943) | -4.205217 \*\*\* (1.260609) |
| Ln(School) | -21.89442\*\*\* (2.032373) | -30.93215\*\*\* (3.508156) | -12.61973\*\*\* (4.034668) |
| Constant | 187.8049\*\*\* (53.06961) | 321.2399\*\*\* (82.6812) | 260.092\*\*\* (81.70504) |
| Country Fixed Effects | No | Yes | Yes |
| Time Dummies | No | No | Yes |
| R-Squared | .8140 | .6756 | .7678 |
| Adjusted R-Squared | .8115 | .6756 | .7678 |
| N | 390 | 390 | 390 |

\*: p<.10; \*\*: p<.05; \*\*\*:p<.001

*Table 2: Regression Analysis*

The first model, a pooled cross-sectional model, does suggest a statistically significant relationship between trade openness and mortality. However, it is a positive relationship (except at very high levels of GDP, because of the negative coefficient on the interaction term). This suggests that critics of globalization are correct, and that free trade only truly benefits wealthier nations, harming poorer nations. Simply put, a 1% increase in trade openness, on average, will increase infant mortality by .32 -.04\*ln(GDP). This model also oddly suggests that population growth negative affects infant mortality, stating that a 1% growth in population increases infant mortality by .02, on average, *ceteris paribus.* Strangely, it suggests no relationship between GDP and mortality. A test of joint significance with the interaction term, however, demonstrates a statistically significant relationship (p-value .000), allowing the inference that a 1% increase in GDP decreases infant mortality by .04 - .04\*ln(open), on average. Overall, however, this model suffers from treating each nation and time period in the same way, not considering their idiosyncrasies, which biases the estimators.  
  
The second model, a fixed-effects model, serves better in controlling for the time-constant unique factors across each nation, but it gives us no insight into the effect of trade on health outcomes, even after a joint test for significance (p-value .262). Additionally, this model still fails to account for time differences.

The third model does account for these time differences, as well as fixed effects. It suggests a negative relationship between trade openness and mortality rates, except at very high levels of GDP, suggesting that the benefits of trade lead to convergence in health outcomes across nations. Additionally, as we would expect, increased GDP and population do reduce mortality rates. Overall, this model is the most accurate of the three.

1. These data yield interesting results about the impact of international trade and globalization. The data suggest that increased trade does improve health outcomes, up to a certain level of GDP. This suggests that as nations develop from trade, their health outcomes converge, along with their welfare. Additionally, increased population growth is connected to improved health outcomes, as a greater abundance of people allow people to specialize. This runs counter to possible concerns that increased population can also reduce health outcomes. Additionally, schooling is shown to improve health outcomes. It is possible that globalization can also improve schooling, as knowledge about educational best practices spreads. While this may cause some multicollinearity, it doesn’t seem to be detrimental to the model.  
     
   Concerns remain, however, about omitted variables. It may be that population growth eventually worsens public health as populations become so large that the infrastructure is unequipped to deal with it. In that case, including *ln(pop)2* could help approximate this shift. Another possible omitted variable is health infrastructure, that is, the kind of health care system the country has. Its strength or weakness could significantly affect mortality rates, though GDP is a possible proxy for it. An omitted variable in this model without proxy, however, is whether or not a nation is at war or undergoing civil unrest. War and unrest could both increase infant mortality, even though the effect on GDP may be positive, as military spending can boost GDP.



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xtreg morti lngdp lnopen opengdp popgrow lnschool time2-time6, fe robust

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