

# Data Analysis for Contemporary Outcomes: Some Empirical and Theoretical Implications

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# Roadmap of my discussion

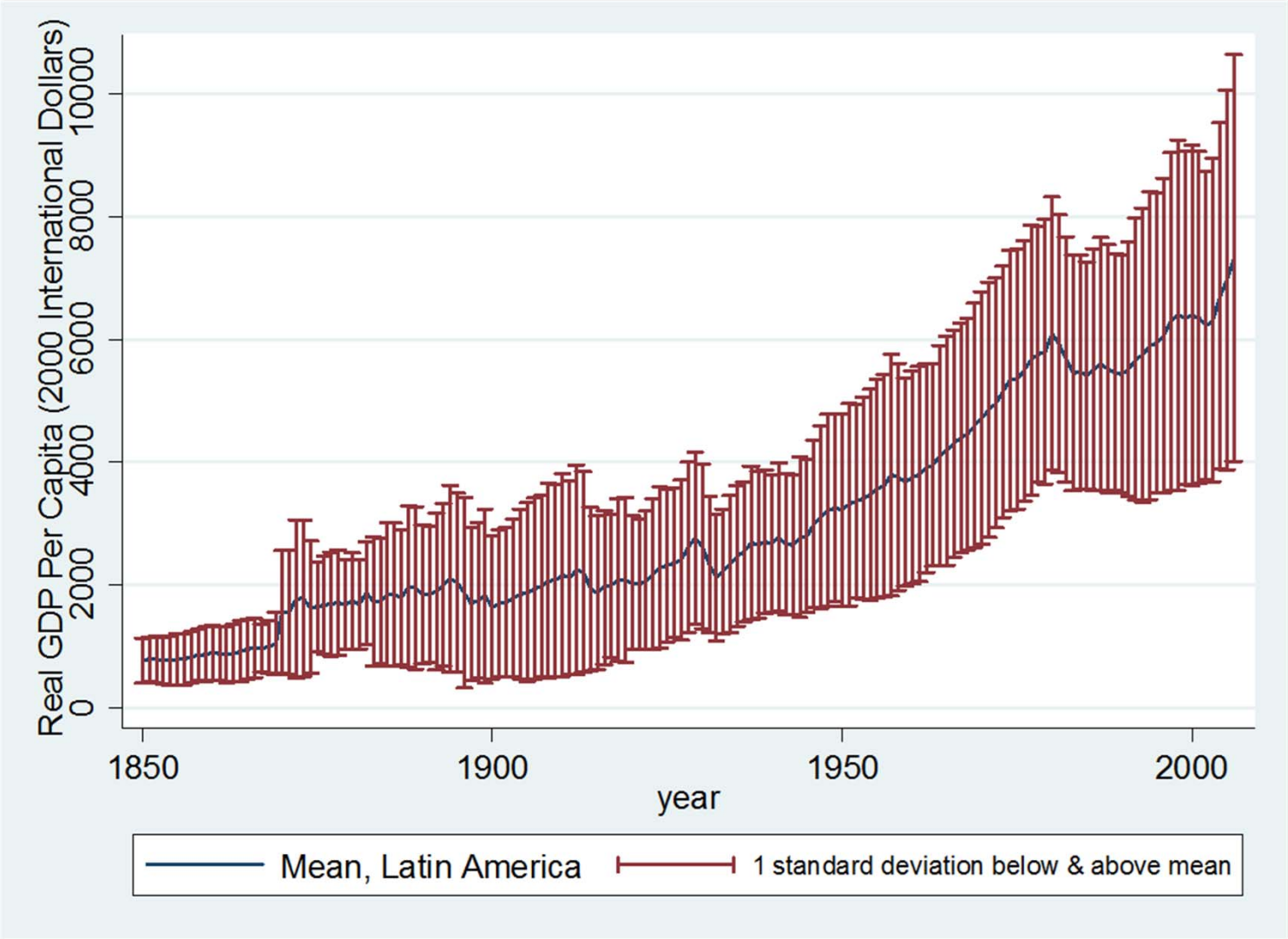
- Empirical and theoretical dimensions of persistence over time in social insurance
- Use basic time-series/panel diagnostics to better demonstrate persistence in social insurance
- Rule out alternative explanations
- A further empirical implication you can test
- Issues with the Error Correction Mechanism (ECM) models
- Issue w/dynamic panel model: endogeneity bias.

# **Divergence rather than convergence in social insurance provision:**

You claim that cross-country variation in social insurance is increasing over time.

This rejects the notion that pressures associated with globalization are imposing uniformity in public spending priorities among countries

**Empirical Suggestion: graph the data and show us that this is true. Below is an example:**



## **Theoretical suggestion:**

Incorporate the notion of increasing returns into your theoretical model. Statistically, if there really is no regression to the mean and a lack of attenuation in the variance among countries over time, then this suggests a self-reinforcing equilibrium.

In other words, why are there no diminishing marginal returns to the increased provision of social insurance over time?

A naïve view would be that countries with low levels of social insurance have the most room to grow their social insurance programs.

# **Evidence for persistence of social insurance over time**

You have some scatterplots of the average value of social insurance in the post debt crisis era (post 1983) against the average value of social insurance in the pre debt crisis era.

The fitted values from an OLS regression suggest a positive relationship (Figures 1 and 2).

The result is robust to controls (Table 1)

# **Exploit the time-series variation in your data or gather data to capture time-series variation**

With basic time-series data analysis, you can test two hypothesis:

1. You should be able to reject the hypothesis that there is a structural break in country-by-country/panel time-series after 1982 debt crisis.
2. You should not be able to reject the hypothesis that the data (country-by-country/panel) has a unit root, which suggests that it is non-stationary in levels.

# **Rule out alternative explanations for persistence in social insurance**

There are many observationally equivalent possibilities:

Social insurance encourages moral hazard: subsidized flood insurance encourages people to move to low-lying land and govt. is forced to insure evermore beachfront property.

Social insurance destroys scale economies that would otherwise attract private providers of insurance to market.

Conversely, lackluster public provision of insurance encourages citizens to finance their own insurance needs via private savings, therefore obviating demand for social insurance.



# **Your theory implies that...**

In the post debt-crisis era, firms in the non-tradables sector can pass on higher labor costs onto consumers. This is because structure of the market is monopolistic/oligopolistic (e.g., telecommunications).

In other words, the formal sector labor market can “afford” to be rigid because it is not subject to global competitive pressures.

# Empirical implication left unexplored?

Table 1: test the hypothesis of a multiplicative effect for your autarky measure/previous social insurance.

The magnitude of the effect of yesterday's autarky on today's social insurance should be conditional on today's level of trade openness:

The greater the degree of trade liberalization, the weaker the regime insiders, and thus the harder it would be for them to impose their policy preferences at the expense of outsiders.

# ECM Panel Model

Calculate cumulative effects (long-run multiplier):  
 $\beta(\text{Independent Variable } t-1)/(1-\beta(\text{Social Insurance } t-1))$ .

Calculate with correct standard error using Bewley Transformation:

- 1) Run regression:  $\Delta Y_t = a + bY_{t-1} + bX_t + b\Delta X_t + e_t$
- 2) Calculate predicted values,  $\Delta Y_t$
- 3) Run regression:  $Y_t = a + d_0\Delta Y_t + d_1X_t - d_2\Delta X_t + m_t$
- 4) Coefficient on  $X_t$  ( $d_1$ ) will give LRM standard error.

# ECM Panel Model

Make more of speed of correction (coefficient on lagged dependent variable in levels). When social spending deviates from its equilibrium level, an error correction will be triggered.

For Column 1 (Table 2) it is  $-.32$ . That implies that it only takes Social Insurance 2.2 years to converge to its long-run equilibrium (half life formula:  $-\ln(0.5)/.32 = 2.2$ ).

One thing you can do, therefore, is split the sample by formerly autarkic countries and non-autarkic countries and see if social insurance equilibrium is restored faster in the case of formerly autarkic countries. Seems like this is implication of your theory.

# Dynamic Panel Models

Problem 1:

Dynamic Panel Bias (Nickell bias) induced when unit fixed effects are estimated with a lagged dependent variable (they are correlated with each other).

- As  $T \rightarrow \infty$ , the bias disappears.
- Monte Carlo studies show that bias is 5-10% with your  $T$  (which is never greater than 20).

Problem 2:

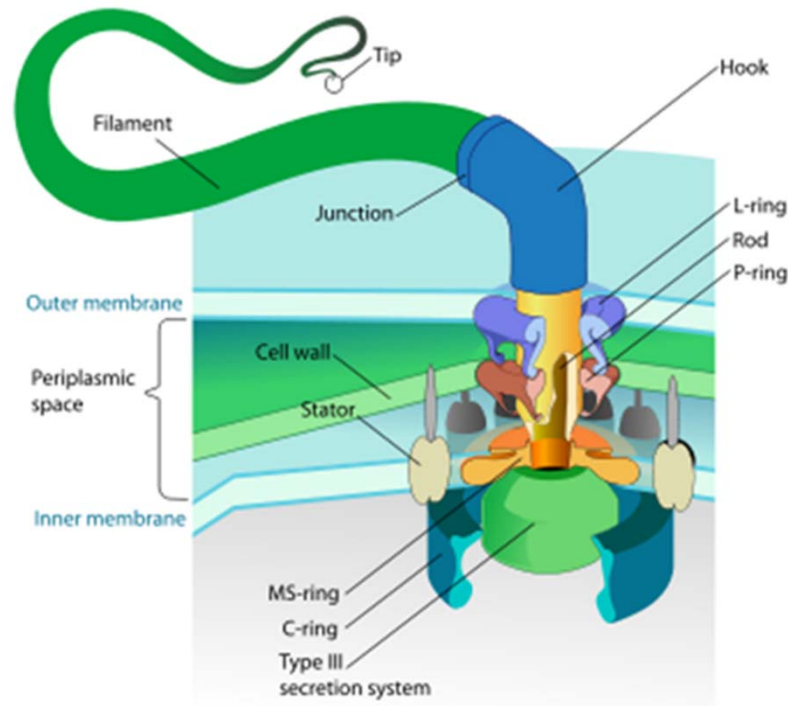
Bias from the fact that the direction of causality can be running from Social Insurance to independent variables: Income Per Capita and Trade Openness.

The Best Available Solution

General Method of Moments (GMM) system estimator is designed for persistent data. It address Nickell bias and endogeneity bias due to reverse causation.

First differencing eliminates the country-specific, unobserved heterogeneity

Differenced variables are instrumented with all available lags in levels; variables in levels are instrumented with suitable lags of their own first-differences.



Bacterial flagellum is driven by rotary engine. This is a very complex biological device. Intelligent design theorists claim that it's proof that biological life was designed by a higher power. "This is too complex for natural selection to have created it." But we know that a random mutation can push life towards great complexity over generations if it confers a great reproductive advantage. The best swimmers will survive and pass on their genes...without ever knowing that this is what they are doing.

# Beware the danger of intelligent design!

Protectionism that appears as “development strategy” based on forethought, desire to stimulate economic development, and ability to implement coherent legislation that meets discrete policy objectives may be something else.

Loosely borrowing Margaret Levi’s (1988) model of revenue generation:

Increased tariffs needed by rulers to generate revenues may have allowed inefficient producers to survive. These producers were therefore around to lobby government for evermore subsidies and rents. And rulers responded because it lowered transaction costs of revenue generation. This is story of Latin America since colonialism!

Rather than development strategy driving policy, there may simply be a series of ad hoc responses by revenue seeking rulers and rent seeking industrialists. If this is true, then what makes post-debt crisis era so special? Protectionism shifted from cascading tariff walls and import quotas to privatization at sweetheart prices and steep barriers to entry to protect incumbent firms.