

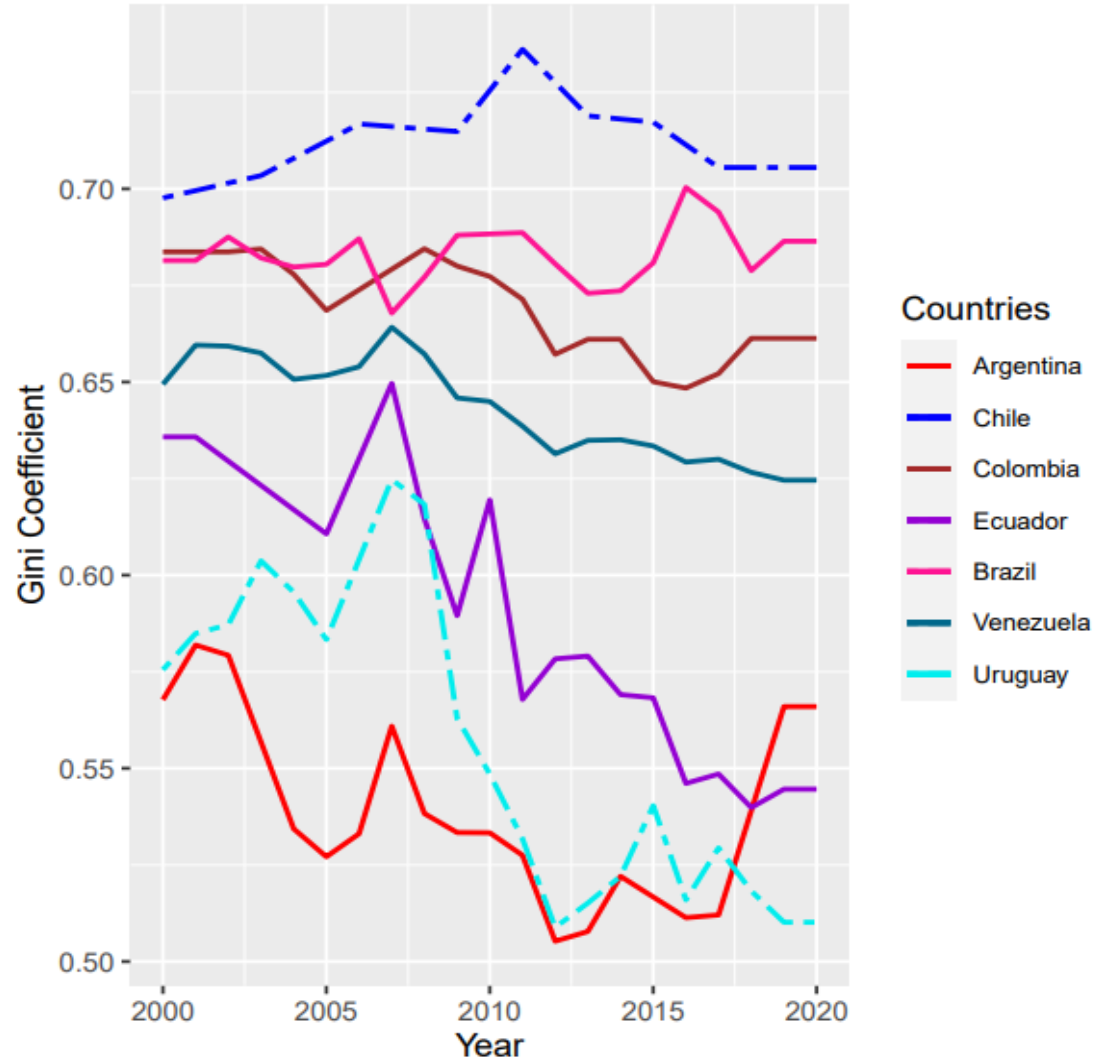
Heterogeneous Effects of Macroeconomic Factors on Income Inequality Dynamics

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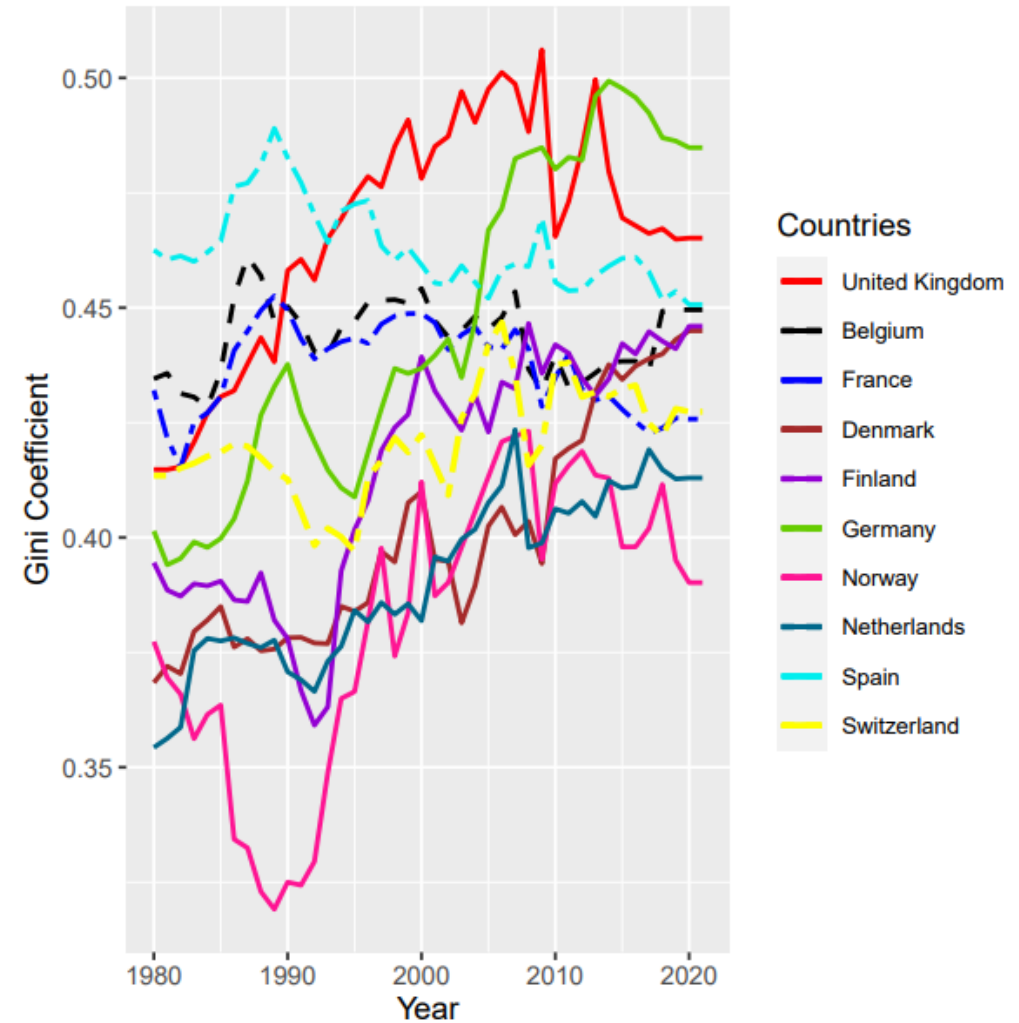
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Income Inequality Dynamics is Heterogeneous

Income Inequality Dynamics – Latin America



Income Inequality Dynamics – Europe



Research Question

- Understand the relation between Income inequality dynamics and macroeconomic fluctuations while also taking into country-specific heterogeneity.

Literature Review + Contribution

Historically, there are a number of studies that attempted to understand the relation between inequality dynamics and macroeconomic activity.

- Schultz (1969), Blinder and Esaki (1978), Buse (1982), Nolan et al. (1987), Blejer and Guerrero (1990), Yoshino (1993), Balke and Slottje (1994), Fluckiger et al. (1995), etc..
- These country specific studies are criticized because they didn't check for unit roots, see Parker(2000) for details.

Literature Review + Contribution

Macroeconomic variables are stable and are not characterized by unit root processes.

- Use nonlinear models instead.
- Structural transformations in the form of breaks points need to be accounted for in the model otherwise, variables or a given system could be falsely concluded as having unit roots.
 - Perron(1989), Janetti and Jenkins(2010)

Literature Review + Contribution

I model the relation between macroeconomic activity and income inequality fluctuations by parsimoniously accounting for

- Country-specific heterogeneity
- Heterogeneous structural changes or break points

Benefits or Contribution of the approach:

- More realistic – model mis-specification is reduced.
- Get insights into cross-country differences? Are there any anomalies?
Why?

Which Macroeconomic Variables to model Income Inequality Dynamics?

- Exports and Imports
- Financial Openness/ Foreign Direct Investment
- Technological Progress
- Credit Market Imperfections
- Economic Crisis
- Economic Growth

Turning to Economic Theory..

to understand how these variables could potentially affect income inequality dynamics.

International Trade

- Income Inequality increases in advanced countries and decreases in developing countries as countries trade.

Stopler and Samuelson (1941).

- The Pattern of trade between two countries could be dependent on complex factors such as (Herman 2022)
 - Number of exports and import relationships
 - Common trading partners
 - Structure of technological differences (Davis 1997)

International Trade

Two similar countries can experience difference consequences of trade liberalization depending on the strength of their supply and demand factors.

- Costinot and Vogel(2010)

Technological Progress

- Skill biased technological progress increases income inequality
Katz and Murphy(1992), Acemoglu (2002).
(Evidence is based mainly on U.S.)
- Depends on whether an innovation is product or process based – could increased or decrease income inequality.
See, Iacopetta(2008) for details

Financial Openness

- The effect of financial openness to income inequality depends on a countries financial depth as measure by private credit over GDP.

Bumann and Lensink(2016)

Econometric Model Specification – Okui and Wang (2020)

$$Y_{it} = X_{it}^T \beta_{git} + \eta_i + \delta_{gt} + \epsilon_{it}$$

$$i = 1, \dots, n, t = 1, \dots, T, g = 1, \dots, G$$

- Y_{it} - Income Inequality
- X_{it} - includes macro-economic variables + lagged dependent variable.
- η_i - is the unobserved individual heterogeneity.
- δ_{gt} - unobserved time varying group specific heterogeneity.
- ϵ_{it} - idiosyncratic error.

Model Assumptions

- The idiosyncratic error term ϵ_{it} at any time period t has zero mean and is not correlated with the regressors X_{it} .
- All groups $g \in \{1, 2, \dots, G\}$ are well separated.
- No multicollinearity within any group structure.

$$Y_{it} = X_{it}^T \beta_{git} + \eta_i + \delta_{gt} + \epsilon_{it}$$

Estimation Procedure – K-means + LASSO

$$(\hat{\beta}, \hat{\gamma}) = \underset{\beta, \gamma \in B^{GT} \times G^N}{\operatorname{argmin}} \frac{1}{NT} \sum_{i=1}^N \sum_{t=1}^T (\tilde{Y}_{it} - \tilde{X}_{it}^T \beta_{g_i,t})^2 + \lambda \sum_{g \in G} \sum_{t=2}^T \dot{w}_{g,t} \|\beta_{g,t} - \beta_{g,t-1}\|, \quad (2)$$

where

$$\dot{w}_{g,t} = \|\dot{\beta}_{g,t} - \dot{\beta}_{g,t-1}\|^{-2}$$

and

$$(\dot{\beta}, \dot{\gamma}) = \underset{\beta, \gamma \in B^{GT} \times G^N}{\operatorname{argmin}} \sum_{i=1}^N \sum_{t=1}^T (\tilde{Y}_{it} - \tilde{X}_{it}^T \beta_{g_i,t})^2.$$

Results

- Initial results, show that Hungary and Singapore are outliers – They don't belong to any estimated group structures.

Estimated Group Membership

| Group 1 | Group 2 | Group 3 | Group 4 |
|---|--|--|---|
| Advanced Economies | | | |
| | Australia Canada Denmark France Germany Greece Israel Italy Japan New Zealand Portugal Slovenia Sweden United States South Korea | Austria Czech Republic Poland Slovakia Spain United Kingdom Norway | Finland Ireland The Netherlands Switzerland |
| Developing Economies | | | |
| Venezuela Honduras Turkey Romania Malaysia Indonesia | Brazil Mexico Iran China Phillippines Egypt Uruguay Chile | Argentina Costa Rica South Africa Russia Vietnam | Bolivia Jamaica Jordon Ukraine Thailand Bulgaria Peru Panama |

Table 9: Estimated group membership segregated by development status - for data without Hungary and Singapore.

Results – Group 3

- Group 3 has 2 estimated break point – one at 1998 and another at 2003.
- Includes Transition Economies such as Czech Republic, Russia, Slovakia, Poland along with Argentina.
- The first break point signifies Argentina's great depression that started in 1998 (Kehoe 2003), Russia's financial crisis in 1998 and Czech Republic currency crisis in 1997 (Horvath 1999).
- In order to maintain their currency credibility, all the three countries pegged their currency to U.S. dollar during this period.
- The second regime for these countries from 1999 - 2003 is predominantly a crisis period.

Group 2 – Predominantly Developed Countries

- Evidence for skill biased technological change increasing inequality.
- Financial Openness is significantly reducing inequality.

Results – Group 1 and Group 4

- Trade liberalization, financial openness together with technological progress affect income inequality differently across all developing countries.
- Financial openness and technological advancement, if significant, has an increasing effect on inequality.
- Exports for some countries in early 1990's is estimated to have a decreasing effect on inequality. However, a higher value of exports post 2000, if significant, is estimated to have an increasing effect on inequality for developing countries.

Results – Banking Crisis

- During the 1990's, there is evidence that banking crisis had a decreasing effect on the dependent variable.
- An economic crisis post 2000, if significant, is estimated to have an increasing effect.

Group 3 – Countries that transitioned to Market Economy

- regression results shed light on the mechanisms that drove inequality dynamics during the fixed exchange rate regime and the subsequent crisis experienced by these countries during early 1900's to early 2000's.
- After recovering from crisis post 2003, a higher value of exports in these countries is estimated to have a decreasing effect on the dependent variable in these countries.
- In addition, imports, financial openness, technological advancement and banking crisis is estimated to have an increasing effect on income inequality.

Thank You!