20 YEARS OF DOLLARIZATION IN ECUADOR
DISCUSSION AND A SYNTHETIC CONTROL ANALYSIS

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OUTLINE

• Introduction
• The Dollarization Debate
• Synthetic Control Analysis (SCA)
• Other Results
• Conclusions
INTRODUCTION

• 2020 marks the 20\textsuperscript{th} anniversary of Ecuador’s dollarization
  • Is it still a good idea? Should Ecuador de-dollarize?
• Even if there are more than a 100 historical cases of dollarization, empirical evidence is still elusive
  • Dollarization cases occur at different points of time
  • Many are very small economies (highly affected by idiosyncratic small shocks)
• Ecuador offers 20 years of dollarization of a relatively large economy
• We apply a SCA to compare dollarized Ecuador with a synthetic (hypothetical) non-dollarized Ecuador
  • Also, does Ecuador’s GDP growth rates depend on oil prices or on the monetary reform?
THE DOLLARIZATION DEBATE
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• Main criticisms of dollarization
  • The problem of loosing monetary policy
  • The problem of the absence of a lender of last resort (LOLR)
  • The problem of lost seigniorage
  • The problem of unnecessary dollarization by its necessary conditions

• Main benefits of dollarization
  • No exchange rate risk
  • Reduced inflation rate and volatility
  • Reduced real interest rates
  • Incentive for more fiscal discipline
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• (1) The problem of loosing monetary policy
  • Critical position
    • A dollarized country cannot execute its own monetary policy (it does not have a central bank anymore)
    • The dollarized country becomes unprotected to external nominal shocks
    • Dollarization is a nominal disaster waiting to happen
  • Reply to the critical position
    • Loosing domestic monetary policy is the idea
    • Many Latin American countries face “fear of floating”; what is then the benefit of having a domestic monetary policy?
    • Avoid a Nirvana-type fallacy: Do not compare the shortcoming of real-world dollarization with an ideal but unreal central bank
      • Empirical question: What is more costly? Domestic nominal shocks or external nominal shocks?
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• (2) The problem of loosing the LOLR
  • Critical position
    • Not having a central bank as a LOLR leaves the financial market unprotected to “sunspot” bank-runs
  • Reply to the critical position
    • The presence of a LOLR (that does not follow Bagehot’s rule) incentivizes moral hazard
    • Dollarization may be a reform used to build credibility of not bailing out an insolvent bank at the cost of not doing so when is needed
  • LOLR (central banks are not the only LOLR actors)
    • Create an emergency liquidity fund (Ecuador)
    • Mandate deposit insurance (U.S.)
    • Allow banks access the world financial market
    • Mandate higher reserve requirements
    • You need access to funds, not necessary to an issuer of money
  • Central banks can also behave as borrowers of last resort (to the benefit of the Treasury)
(3) The problem of lost seigniorage

- Critical position
  - By dollarizing, the government gives up the benefits of seigniorage
- Reply to the critical position
  - Seigniorage: Profits (or losses) from issuing money (or minting coins)
    - With interest-rate-parity
      - \[ S = e \cdot i^F R - i^D B - C \]
      - Depreciation expectations reduce seigniorage
      - Low money demand (because there is high inflation) means lower seigniorage (higher \( i^D \))
  - Countries that face a potential dollarization benefit more from the inflation tax than they do from seigniorage
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• (3) The problem of lost seigniorage
  • Reply to the critical position (cont...)
    • Seigniorage: Revenue from creating money
    • Inflation tax
      • Seizing purchasing power from the public
      • It is a non-legislated tax (is it constitutional?)
    • Isn’t loosing seigniorage (and the inflation tax) a good price to pay for price level stability?
    • The inflation tax is a highly distortive and regressive tax, why keep it?
  • Fiat-money based free banking regime: Let private banks issue their own convertible banknotes
    • Seigniorage remains in the country, but in private hands
    • Crazy? This happens today in Hong-Kong, Scotland, and Ireland
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• (4) The problem of unnecessary dollarization by its necessary conditions (‘‘catch-22’’)
  • Critical position
    • Dollarization is unsustainable without other reforms (such as fiscal discipline)
    • However, by executing these other reforms dollarization becomes unnecessary
  • Reply to the critical position
    • What about Ecuador?
    • What if dollarization is what is needed to trigger other reforms?
    • Dollarization is not intended to solve all economic problems (may be necessary even if not sufficient)
    • Dollarization is not just about a change in monetary policy, it is first and foremost an institutional strengthening reform
    • Arguably, dollarization contributed to constraint Rafael Correa’s populist policies
THE DOLLARIZATION DEBATE: REPLY TO MAIN CRITICS

• (4) The problem of unnecessary dollarization by its necessary conditions
  • Reply to the critical position (cont...)
    • Dollarization helps to protect policy from undoing their reforms and politicize monetary policy again
    • Again, avoid a Nirvana-type fallacy, dollarization takes place under a realistic set of reforms, not under the ideal ones
SCA ANALYSIS
SYNTHETIC CONTROL ANALYSIS

• Synthetic control analysis (SCA) allows to build a counterfactual of a treated unit
  • More precisely, allows to deal with the interaction of fixed effects with a time-varying coefficient when there is only one observation (one group or country)

• Conditions
  • The treated unit is the only one facing a shock
  • The shock happens is identifiable in one period
  • Donor countries (the control group) has similar characteristics than the treated unit
    • You need a representative sample over a big sample
  • Enough observations in the pre-shock period to build the synthetic estimation
  • Intuition: Synthetic-Ecuador is a weighed average of other Latin American countries
SYNTHETIC CONTROL ANALYSIS

• Method (punchline)
  • Let $W = w_1, \ldots, w_j$ be the weights of all $J$ control countries
    - $0 \leq w_j \leq 1$
    - $\sum w_j = 1$
  • Let there be $m$ predictors $(X_1, \ldots, X_m)$ of $Y_j$
  • Let $\|u\| = \sqrt{u'Vu}$
  • Then: $\min_{\{W\}} \|X_1 - X_0 W\|

• $\|X_1 - X_0 W\| = \sqrt{(X_1 - X_0 W)'V(X_1 - X_0 W)}$
• Where $V$ is a diagonal matrix that weights the predictors (or covariates) according to their predictive power
• First, choose $V$ to minimize the MSPE of the predicted variable
• Then, chose $W$ to minimize $\|X_1 - X_0 W\|$
SYNTHETIC CONTROL ANALYSIS

• Application
  • We estimate three variables for a synthetic Ecuador
    • Real GDP per capita (PPP)
    • Export share (%GDP)
    • Infant mortality
  • We build two models
    • One without outcome variables
    • One with outcome variables
### SYNTHETIC CONTROL ANALYSIS

#### Table 1. Real GDP per capita (PPP), SCA country weights

<table>
<thead>
<tr>
<th>Country</th>
<th>Model 1 (without outcome variables)</th>
<th>Model 2 (with outcome variables)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bolivia</td>
<td>-</td>
<td>0.646</td>
</tr>
<tr>
<td>Brazil</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chile</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Colombia</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.205</td>
<td>0.354</td>
</tr>
<tr>
<td>Paraguay</td>
<td>0.728</td>
<td>-</td>
</tr>
<tr>
<td>Peru</td>
<td>0.067</td>
<td>-</td>
</tr>
<tr>
<td>Uruguay</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**RMSPE**  
375.1125  
315.6147
## SYNTHETIC CONTROL ANALYSIS

### Table 2. Real GDP per capita (PPP), predictor balance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ecuador</th>
<th>Model 1 (without variables)</th>
<th>Model 2 (with outcome variables)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covariates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry (%GDP)</td>
<td>28.41</td>
<td><strong>29.88</strong></td>
<td><strong>29.79</strong></td>
</tr>
<tr>
<td>Manufacturing (%GDP)</td>
<td>21.35</td>
<td>15.80</td>
<td>16.65</td>
</tr>
<tr>
<td>Investment (%GDP)</td>
<td>21.15</td>
<td>19.87</td>
<td>14.30</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>8.53</td>
<td>5.48</td>
<td>7.39</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita (PPP) (1981)</td>
<td>5831</td>
<td></td>
<td>5627</td>
</tr>
<tr>
<td>GDP per capita (PPP) (1999)</td>
<td>4979</td>
<td></td>
<td>5622</td>
</tr>
</tbody>
</table>
## SYNTHETIC CONTROL ANALYSIS

Table 3. Real GDP per capita (PPP), normalized variable weights in diagonal $V$ matrix

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 (without variables)</th>
<th>Model 2 (with outcome variables)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry (%GDP)</td>
<td>0.4592</td>
<td>0.0163</td>
</tr>
<tr>
<td>Manufacturing (%GDP)</td>
<td>0.0064</td>
<td>0.0130</td>
</tr>
<tr>
<td>Investment (%GDP)</td>
<td>0.5262</td>
<td>0.0005</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>0.0082</td>
<td>0.0001</td>
</tr>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP per capita (PPP) (1981)</td>
<td></td>
<td>0.6631</td>
</tr>
<tr>
<td>GDP per capita (PPP) (1999)</td>
<td></td>
<td>0.3070</td>
</tr>
</tbody>
</table>
SYNTHETIC CONTROL ANALYSIS

Figure 2. Real GDP per Capita PPP (2011 Int’l USD), Ecuador and synthetic estimations
SYNTHETIC CONTROL ANALYSIS

Figure 4. Synthetic estimations over Ecuador percent gaps
SYNTHETIC CONTROL ANALYSIS

Figure 5. Export share of GDP, Ecuador and synthetic estimations
SYNTHETIC CONTROL ANALYSIS

Figure 7. Infant mortality, Ecuador and synthetic estimations
OTHER RESULTS
OTHER RESULTS

Figure 9. Real effective exchange rate and terms of trade (2010=100)
OTHER RESULTS

Figure 10. Unemployment rate
OTHER RESULTS

Figure 11. Poverty rates
OTHER RESULTS

Figure 12. GINI coefficient
CONCLUSIONS

• The debate over dollarization is more complex than “loosing domestic monetary policy”
• We contribute with a novel application
  • SCA method finds positive income results
  • Other data available shows that dollarization economic benefits do not come with social costs
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