Latin American fall and rebound since the COVID-19

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Introduction

- The COVID-19 crisis has significantly challenged the measurement of economic conditions around the globe
- Latin America is not the exception
Introduction

- **Context**: During COVID-19 times a continuous reading of the Latin American economy’s vital sign is of the utmost importance

- **Aim 1**: Tracking turning points in the region under this unstable environment

- **Aim 2**: Tracking how deep (buoyant) an unfolding recession (expansion) in the region can become

- **Problem**: The magnitudes of real activity have become more heterogeneous than ever
  - This significantly complicates economic modelling
Literature

- Hamilton (1989): Univariate Markov-switching models where unconditional means $\mu_{exp}$ and $\mu_{rec}$ are constant over time.
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- Hamilton (1989): **Univariate** Markov-switching models where unconditional means $\mu_{\text{exp}}$ and $\mu_{\text{rec}}$ are constant over time
- Chauvet (1998): **Multivariate** Markov-switching models where unconditional means also constant

- Eo and Kim (2016): **Univariate** Markov-switching models where unconditional means are time-varying

- Leiva-Leon et al. (2021): **Multivariate** Markov-switching models where unconditional means are time-varying
What we do

- We employ the framework recently proposed in Leiva-Leon et al. (2021) for the study of LATAM’s cyclical position:
  
  1. Markov-Switching Dynamic Factor Model: Accounts for business cycle asymmetries
  2. Mixed Frequency and Ragged Edges: Provides high-frequency real-time updates
  3. Flexible Time-varying Means: Measures heterogeneous recessions and expansions

- Estimate the proposed nonlinear factor model for the largest LATAM economies, using quarterly GDP and monthly activity indicators
  - Argentina, Brazil, Chile, Colombia, Ecuador, Mexico and Peru.

- These inferences are summarized into a Latin American Weakness Index (LAWI) that provides:
  → timely assessments of LATAM’s cyclical position
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The Model

- Real activity indicators, $y_{i,t}$, can be expressed as:

$$y_{i,t} = \gamma_i \Theta(f_t) + u_{i,t},$$

- The idiosyncratic components, $u_{i,t}$, are given by

$$u_{i,t} = \psi_{i,1} u_{i,t-1} + \ldots + \psi_{i,p} u_{i,t-p} + e_{i,t}, \quad e_{i,t} \sim \mathcal{N}(0, \sigma_i^2) \text{ i.i.d.}$$

- The common factor, $f_t$, follows flexible nonlinear dynamics to accommodate for recessions and expansions of different magnitudes,

$$f_t = \mu_{0,\tau_i}(1 - s_t) + \mu_{1,\tau_i}s_t + e_{f,t}, \quad e_{f,t} \sim \mathcal{N}(0, \sigma_f^2) \text{ i.i.d.},$$

where $s_t \in \{0, 1\}$, with 0 for recessions, and 1 for expansions.

- The regime-dependent means, $\mu_{1,\tau_i}$ and $\mu_{0,\tau_i}$, correspond to the expected value of the factor, $f_t$, during the $\tau_i-$th expansion or the $\tau_i -$th recession.
We fit the nonlinear factor model to the seven largest economies in the LATAM region by employing the following quarterly and monthly indicators of activity:

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<tr>
<th>Argentina</th>
<th>Brazil</th>
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<td>Building Permits Index</td>
<td>Global confidence index</td>
<td>Private Consumption Indicator</td>
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<td>economic activity index</td>
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Colombia

Quarterly Real GDP Growth

Monthly Activity Index

Monthly Recession Probability
Ecuador

Quarterly Real GDP Growth

Monthly Activity Index

Monthly Recession Probability
Mexico

Quarterly Real GDP Growth

Monthly Activity Index

Monthly Recession Probability
Peru

Quarterly Real GDP Growth

Monthly Activity Index

Monthly Recession Probability
**Latin American Weakness Index**

- **LAWI**: proportion of the LATAM economy in recession

\[
LAWI_t^{(l)} = \sum_{\kappa=1}^{K} \omega_{\kappa,t} s_{\kappa,t}^{(l)}
\]
Latin American Weakness Index: Zoom into COVID crisis

- The country-specific contributions to the LATAM economic weakness have exhibited significant variations in recent times.
- Monitoring the internal sources of economic weakness in the region represents is crucial for policy makers.
Country-specific “Intensity” of Growth

\[ f_t = \left( \mu_{0,\tau_i}(1 - s_t) + \mu_{1,\tau_i}s_t \right) + e_{f,t}, \quad e_{f,t} \sim \mathcal{N}(0, \sigma_f^2) \]

Intensity: \( \mu_t \)

Disturbances
Latin American Intensity Index

- For each country, the common factor can be decomposed into

\[ f_t = (\mu_{0, \tau_i} (1 - s_t) + \mu_{1, \tau_i} s_t) + e_{f, t}, \quad e_{f, t} \sim \mathcal{N}(0, \sigma_f^2) \]

- **LAII**: Growth intensity of the LATAM economy

\[ \text{LAII}_{t}^{(l)} = \sum_{\kappa=1}^{K} \omega_{\kappa, t} \mu_{\kappa, t}^{(l)} \]
Application: Effect of US Financial Conditions on LATAM

What is the time-varying relationship between U.S. financial conditions and LATAM’s economic weakness?

\[ LAII_t = \alpha_t + \beta_t FCI_t + e_t, \]

where \( \alpha_t \) and \( \beta_t \) are assumed to follow random walks.
Application: Effect of US Financial Conditions on LATAM

- The contemporaneous correlation between LATAM real activity and FCI have increased substantially since the COVID crisis.

- This estimates suggest the increasing importance of U.S. financial conditions for LATAM’s economic recovery.
There is heterogeneity regarding the sensitivity of country-specific weakness to U.S. financial conditions.
Conclusions

- This paper brings new statistical measures for LATAM economies to the table for the use of policy makers
  1. Latin American Weakness Index (\textit{LAWI}): measures the share of LATAM region in recession
  2. Latin American Intensity Index (\textit{LAII}): measures the intensity of LATAM crisis and recoveries

- The framework provides high frequency real-time updates on the cyclical position of LATAM economies as new information is released

- We also assess the effect of external developments on the LATAM region, by focusing on the time-varying effect of U.S. financial conditions.
  - The estimates suggest that sensitivity of LATAM activity to U.S. financial conditions has substantially increased since the COVID-19 crisis.