Policy brief

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Subnational income, convergence, and the COVID-19 pandemic

In brief

- This brief investigates the effects of the COVID-19 pandemic on gross national income in Pakistan and its districts.
- To address the lack of available data, we developed a machine-learning algorithm that can predict economy activity in real time by leveraging administrative, night-light, and other real-time data.
- Urban districts in Pakistan drove the slow-down in Pakistani income, and higher COVID-19 rates were significantly correlated with lower income growth.
- Policymakers can measure real time economic activity by combining large datasets. Preemptive and prompt interventions are needed to limit spillovers across the whole country.

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I. Policy motivation for research

The COVID-19 pandemic and the consequent government containment policies have deeply hit our societies and our economies since February 2020. While the effects on high income countries have been detailed by several authors, scarce data availability hindered a thorough understanding of the consequences for low-income countries.

We studied the effects of the COVID-19 pandemic on gross national income in Pakistan and its districts. To address the lack of available data, we developed a nowcasting machine-learning algorithm that can predict in real-time our variable of interest leveraging on traditional administrative data, night-lights and other real-time data. We draw three conclusions from this approach.

1. It possible to measure real time economic activity by combining large datasets.
2. Urban districts in Pakistan drove the slow-down in Pakistani income.
3. There is a robust negative correlation between income growth and COVID-19 incidence.
4. The composition of these two effects sped up convergence, as the steeper fall in income growth experienced by richer districts reduced within-country inequality. At the same time, a "convergence to the bottom" took place, as the level of income declined with inequality

II. Findings

Countries' long-term growth prospects have typically strongly depended on the dynamism of some rich districts, in particular urban ones. COVID-19 exposed their frailty and heightened sensitivity to adverse shocks compared to different areas in the same country. Failure to account for this district-specific vulnerability is likely to lead policy makers to allocate resources inefficiently not only during a crisis but also during good times, as neglecting this issue weakens the case for differential preemptive and monitoring policies across districts. In fact, this study prompts to the fact that both precautionary and ex-post immediate interventions in such areas should be implemented not to hurdle growth perspectives.

III. Implementation

Our study highlights the importance of real time predictions for economic activity for policy perspective. In fact, we show how to tackle data scarcity concerns on measuring economic activity by combining administrative data with night lights and other non-traditional data. Indeed, they can provide a reasonably high quality view on differential development across subnational areas. Furthermore, both the higher volatility in income growth in leading districts and the correlation evidence with public health should be kept in mind by policy makers upon drawing the allocation of the national budget.

IV. Policy implications

1. **Combining large on- and off- shore datasets on the country can reveal interesting real time measures of economic activity.**

   This work shows beyond reasonable doubt that by combining large amounts pre-existing district level datasets laying within and outside the country is a useful way to produce new measures of aggregate real time economic activity. Importantly, the policy makers may improve our procedures and add new varieties of datasets to produce forecasts of a target variable of their choice provided that they have sufficient training data available for their target variable for maching-learning to take place.

2. **Both cross-district inequality and differential sensitivity to shocks should be tackled by policy makers.**

   While promoting a more homogeneous growth across one country's districts is definitely a reasonable policy, as it shields the overall country's growth from local shocks, enacting policies that protect the more dynamic areas during the process is likely to be a fruitful choice. In fact, the heightened frailty of dynamic areas uncovered in this study can also have second-round effects on the rest of the country through production and distribution networks on the one hand and through public administration on the other in terms of raising additional debt and lower tax revenues collection.

3. **Public health and economic growth are tightly linked.**

   This work also proves beyond any doubt that there is a robust tie between public health and the economy. In fact, the number of cases, deaths and recoveries due to COVID-19 is shown to be negatively correlated to income growth. Even though we do not make claims of causality, health-care investment can still be argued to be a priority. In fact, even if better health-care facilities were able to only reduce the degree of severity of containment policies necessary to face such events, that would most likely qualify as a success.

4. **Mitigating measures should be immediate so as to avoid prolonged effects on economic growth.**

   Lastly, these results further stress the complexity of economic development, as leading districts in Pakistan are those that experienced the steepest fall. For this reason, it can be argued that preemptive and prompt interventions are needed to limit spillovers across the whole country.

VI. Further readings

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