COVID IS THE SIGNIFICANT STRUCTURAL BREAK: INPUT-OUTPUT DECOMPOSITION ANALYSIS

Dr. ABHRAJIT SINHA
ASSISTANT PROFESSOR IN ECONOMICS
DEPARTMENT OF ECONOMICS
HOOGHLY MOHSIN COLLEGE

ABSTRACT: Here, I am finding out the structural break through Structural Decomposition Method of the Input-Output Analysis.

KEYWORDS: Structural Break, Structural Decomposition, Input-Output Analysis.

Input Output Methodology has been used to analyze the decomposition of structural change from a particular period to another period. The relevant formula is given below (Sinha, 2015, Sinha 2019).

\[ \Delta X = V_1(I-A_1)^{-1}\Delta F + \Delta V(I-A) F_0 = ISR_1\Delta F + \Delta ISR.F_0 \] ……………………………….(1)

This method decomposes the Value Added to two effects, (i) Final Demand Effect and (ii) Input Structure and Reallocation Effect (simultaneous effect because as value added is identically equal to (1-input sum of a particular industry), hence, infinitesimal change in input structure will bring corresponding change in the value added per unit). However, the demerit of this method is that if any structural break or recession comes in between periods 0 and period 1, then this decomposition method fails to explain it. So, to analyze recessionary effect, the period 1 must end to a recession by this method.

I have found an advancement over this decomposition method that, if coupled with this broad decomposition analysis, will be able to find out any structural break or recessionary effect through decomposition analysis. The idea is to perform the decomposition analysis for each particular year to find out the year of structural break or recessionary outlier.

We have done this structural decomposition analysis, for the Indian economy, taking the input structure matrix of 2007-08 as given (in India, the problem is that since 1968-69, every five years, Input-Output Transaction Table had been published by the Ministry of Statistics and Programme Implementation up to 2007-08 and thereafter there is no official Input-Output Table. So, the first problem is that there is no regular yearly published Input-Output Transaction Table (IOTT) and the second problem is that we are not obtaining the publication of Input-Output Transaction Tables since 2007-08). In this scenario, taking 2007-08 input structure matrix and value added matrix as fixed, we have done the decomposition solely based upon the change in the final demand structure for each pair of consecutive years since 2004-05.

We have found the year 2020-21 as the most significant structural break (through sectoral decomposition as well as by the aggregate decomposition) by our structural break methodology. 2020-21 is the year of COVID. As has been opined by the Human Development Report, COVID is the “the worst economic fallout since the Great Depression” (2020...
HUMAN DEVELOPMENT PERSPECTIVES COVID-19 AND HUMAN DEVELOPMENT: Assessing the Crisis, Envisioning the Recovery; [http://hdr.undp.org](http://hdr.undp.org). So, our methodology correctly identifies the structural break and provides economic justification of that structural break. The general endogenous structural break methodologies suffer from the limitation that they are often unable to provide economic reasoning and interpretation of the structural break. Our method is above such limitation.

Thus, Structural Decomposition for a long period, say, from 1973-74 to 2023-24 cannot provide the recessionary fluctuation unless and until 2023-24 is itself a recessionary year (do it by yourself). Analysis has already been done in Sinha 2015 and Sinha 2019. However, if the Structural Break Decomposition is taken into account, then we can find out the recessionary outliers. Table-1 tells the story. Decomposition analysis is showing that during 2020-21, Productive Services (S1) has been worstly hit (-503825 Rs. Crores) and then the Industrial Sector (-275999 Rs. Crores). Aggregate decline is (-546175 Rs. Crores) because even during this period Agriculture has provided significant positive contribution (+222490 Rs. Crores).

References:


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>277798</td>
<td>222490</td>
<td>377756</td>
<td>186451</td>
<td>311164</td>
<td>291129</td>
<td>133921</td>
<td>167240</td>
<td>251265</td>
<td>173160</td>
<td>202063</td>
<td>233876</td>
<td>140130</td>
<td>105346</td>
<td>105353</td>
<td>75191</td>
<td>72353</td>
</tr>
<tr>
<td>I</td>
<td>175827.2</td>
<td>-275999</td>
<td>-62543</td>
<td>454063</td>
<td>431756</td>
<td>300859</td>
<td>310860</td>
<td>257318</td>
<td>267477</td>
<td>288370</td>
<td>289266</td>
<td>364305</td>
<td>264366</td>
<td>203082</td>
<td>198006</td>
<td>243136</td>
<td>141685</td>
</tr>
<tr>
<td>S1</td>
<td>394322.4</td>
<td>-503825</td>
<td>653945</td>
<td>730809</td>
<td>555541</td>
<td>529942</td>
<td>449707</td>
<td>141917</td>
<td>340508</td>
<td>421821</td>
<td>-238848</td>
<td>390063</td>
<td>236787</td>
<td>254611</td>
<td>217592</td>
<td>217251</td>
<td>163988</td>
</tr>
<tr>
<td>S2</td>
<td>220385.8</td>
<td>11159</td>
<td>331571</td>
<td>278425</td>
<td>242004</td>
<td>236770</td>
<td>160631</td>
<td>21389</td>
<td>230354</td>
<td>148129</td>
<td>148109</td>
<td>120440</td>
<td>160785</td>
<td>119611</td>
<td>64339</td>
<td>42402</td>
<td>44500</td>
</tr>
<tr>
<td>Agg. Decomposition</td>
<td>1068133.4</td>
<td>-546175</td>
<td>1300129</td>
<td>1655648</td>
<td>1540605</td>
<td>1390704</td>
<td>1070219</td>
<td>1857844</td>
<td>1089804</td>
<td>1072513</td>
<td>400650</td>
<td>1108764</td>
<td>802068</td>
<td>682650</td>
<td>585294</td>
<td>577901</td>
<td>422616</td>
</tr>
</tbody>
</table>

Source: Own Calculations based upon Input-Output Matrix 2007-08 and Component-wise GDP of RBI DATABASE (2020-21)