



# 9<sup>TH</sup> MALAYSIA STATISTICS CONFERENCE

Department of Statistics, Malaysia

Dealing with Uncertainties: Unearthing Measures for Recovery

## SOCIAL ACCOUNTING MATRIX:

### BACKWARD AND FORWARD LINKAGES OF PRODUCTION ACTIVITIES

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#### INTRODUCTION

Linkages analysis is commonly used to determine the interdependence in production activities. Since late 1950's, interindustry linkages has been studied with the purpose of identifying the key sectors. The linkages across all sectors in an economy play a proactive role in enhancing production growth within the country. **Backward and forward linkages** are the measurement that have been used comprehensively for the analysis of interdependent relationships among production activities. This study is an initial attempt to study the linkages analysis using SAM 2015 which capture the monetary transaction between income and expenditure in the Malaysia economy.

#### OBJECTIVES

To analyse the interdependence of the production activities, to determine the **key sector** of Malaysia's production activities as well as to determine the importance of key sectors.



#### LITERATURE REVIEW

Temursho U. (2016) discussed all industries are typically categorized into four (4) types of linkages classifications once the normalized backward and normalized forward linkages are determined.

Bekhet H. A. (2010) has employed Leontief model to investigate the backward and forward linkages indices. Secondary data was employed based on the input-output tables compiled by the Department of Statistics Malaysia (DOSM).

#### METHODOLOGY

This study is an initial attempt to apply Rasmussen approach using statistics from SAM 2015 with prototype calculation method recommended by Asian Development Bank (ADB) via **Leontief inverse model**,  $L = (I - A)^{-1}$  and **Ghosh inverse model**,  $G = (I - B)^{-1}$ .

Production activities are classified into **linkages classification matrix** based on the value of normalized backward and forward linkages.



#### ANALYSIS & FINDINGS

##### Summary of Classification Matrix

		Normalized Backward Linkage	
		Low (<1)	High (≥1)
Normalized Backward Linkage	Low (<1)	<b>Generally Independent</b> <ul style="list-style-type: none"> <li>Fishing and aquaculture</li> <li>Textiles, wearing apparel and leather products</li> <li>Real estate</li> <li>Research and Development</li> <li>Education</li> <li>Government services</li> </ul>	<b>Dependent on Interindustry Demand</b> <ul style="list-style-type: none"> <li>Crops, animal production and hunting</li> <li>Forestry and logging</li> <li>Extraction of crude petroleum &amp; natural gas</li> <li>Utilities</li> <li>Wholesale and retail trade</li> <li>Finance</li> <li>Rental and leasing</li> <li>Business services</li> </ul>
	High (≥1)	<b>Dependent on Interindustry Supply</b> <ul style="list-style-type: none"> <li>Mining of metal ores</li> <li>Food products</li> <li>Beverages and tobacco products</li> <li>Wood, furniture, paper products and printing</li> <li>Electrical, electronic and optical products</li> <li>Construction of buildings</li> <li>Civil engineering</li> <li>Food &amp; beverage and accommodation</li> <li>NPISHs</li> </ul>	<b>Generally Dependent</b> <ul style="list-style-type: none"> <li>Mining of coal and lignite</li> <li>Other mining and quarrying</li> <li>Petroleum, chemical and rubber products</li> <li>Metal and other non-metallic mineral products</li> <li>Transport equipment and other manufacturing</li> <li>Specialised construction activities</li> <li>Transportation and storage</li> <li>Information and communication</li> <li>Health</li> <li>Other services activities</li> </ul>

This is the classification matrix of production activities based on the value of normalized backward and forward linkages.

**Backward linkage:** significant economic pull on other sectors

**Forward linkage:** strong economic push to other sectors.



#### CONCLUSION & RECOMMENDATION

This paper illustrated an approach to **identify key sectors** among the production activities in Malaysia. The empirical results show most of the production activities are **dependent on inter-industry supply**. These linkages analysis on production activities can be performed as a **basic structure** of comparison with latest available data for enable measurement on the uncertainties of economic structure from pre-pandemic to recovery phase.

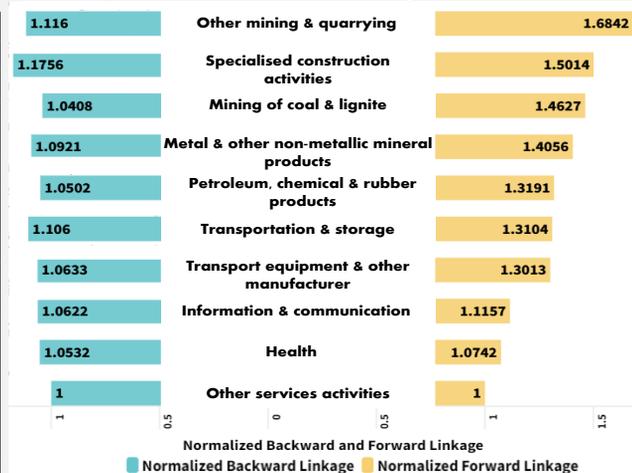
#### REFERENCES

- Temursho, U. (2016). Backward and forward linkages and key sectors in the Kazakhstan economy.
- Paudel, Ramesh & Thapa-Parajuli, Resham. (2020). Backward and Forward linkages and value chain for goods and services in Nepal.

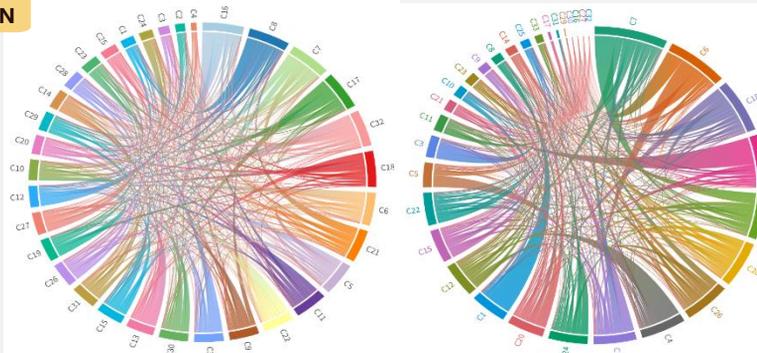
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#### The identified Key Sectors



**Key sectors** has both backward and forward value of more than one. These are the 10 key sectors with high normalized backward and forward value. A high normalized backward indicates substantial sectoral interdependence. It indicates that the production activities have a strong economic pull on the other sectors which mean that the remaining production activities would suffer losses if there are less consumption on these production activities's output.



These chord diagram display the connections among production activities for both backward and forward linkages. It is arrange from which production activity has highest connections to the lowest connections. For backward linkage, the C16 (Constructions of building) has the highest connection with other activities while for forward linkage, the C7 (other mining & quarrying) has the highest connection.