Linkages Analysis of Construction Sector in Malaysia

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PRESENTATION OUTLINE

Background of the study 1. Introduction

1

2

3

4

- 2. Problem Statement
- 3. Objectives of the study

Background of the study



Introduction

Construction in Malaysia

Construction Sub-sector

Construction Sector in Malaysia

- Important and valuable industry of the Malaysian economy.
- The average contribution to GDP is around 4%, which is relatively small as compared to other sectors of the economy.
- Strong backward linkages.
- More than one million people are engaged in this industry which is 8-9 % of total available work force (Economic Statistics Time Series, DOSM 2013)



Construction Sub-sector



Problem Statement

In the Tenth Malaysia Plan (2011-2015) and Eleventh Malaysian Plan (2016-2020), the government is targeting construction sector as the key sector.

Construction sector has two times multiplier effect to another 120 sectors relying on industry for their progress and sustainability (CIDB, 2015).

However, there is concern that the construction sector capability and capacity in stimulating economic growth especially in terms of policy decision purposes.

> Analysis of construction industry strong linkages with another sector of the economic system is essential to economic development. (Lean, 2001).

Objectives

To analyse the degree of value added and output contribution of the construction sector to the domestic economy. To assess the spill over effect and linkages of construction sectors to the domestic economic.



Methodology





Input-Output Analysis Assumption of input-output

- Input-output is a linear model, i.e. fixed input coefficients
- This assumption leads to the following implications:
- No substitution among inputs
- No resource contraints (unlimited labor and capital)

Note: This may lead to the open criticism of the linearity assumption in the sense that it is unable to incorporate market mechanisms that work through price incentives

Input-Output Analysis Assumption of input-output

- However, the validity of input-output models can be justified:
- Production technique will not change much over a short period before any substitution takes place
- Even if the substitution does occurs, it may reflect only at firm levels while at industry levels the composition of inputs is likely stable.

Input-Output Analysis

Input-Output System

Quadrant 1 Intermediate inputs to production	Quadrant 2 Final demand	Total output
Quadrant 3 Primary inputs to production	Quadrant 4 Primary inputs to final demand	
Total output		

Input-Output Analysis

Aggregated input-output table for 2010 (RM million)

ABSORPTION MATRIX OF DOMESTIC PRODUCTION AT BASIC PRICES, 2010 124 COMMODITY x 124 COMMODITY (RM'000)	Commodity Agriculture	Mining and Quarrying	Manufacturing	Construction	Services	Total Intermediate Demand	Private Consumption	Government Consumption	Gross Fixed Capital Formation	Change in Inventory	Domestic Demand	Total Export	Total Final Demand	
Commodity														
Agriculture	7,766,028	-	73,852,424	40,561	6,130,130	87,789,143	19,644,842	-	3,427,242	429,623	23,501,708	12,573,978	36,075,686	12
Vining and Quarrying	38,565	947,961	60,192,212	2,223,904	848,898	64,251,540	135,850	-	-	(399,722)	(263,872)	43,195,402	42,931,530	10
Manufacturing	14,057,556	5,261,888	180,580,820	28,485,765	78,590,604	306,976,635	84,299,604	-	20,266,074	7,675,359	112,241,037	476,957,255	589,198,292	89
Construction	819,872	910,351	4,360,734	6,493,010	12,116,105	24,700,071	6,835,230	-	58,796,108	-	65,631,338	5,447,639	71,078,977	95
Services	14,359,024	4,959,336	114,104,239	9,933,724	235,155,383	378,511,706	245,655,401	101,379,562	17,107,206	2,155,330	366,297,499	106,359,504	472,657,003	85
FOTAL INTERMEDIATE INPUT	37,041,045	12,079,537	433,090,429	47,176,963	332,841,120	862,229,094	356,570,928	101,379,562	99,596,630	9,860,590	567,407,710	644,533,777	1,211,941,487	2,07
Direct Purchases Abroad by Residents	-	-	-	-	-		26,733,040	#REF!	-	#REF!	#REF!	#REF!	#REF!	
Domestic Purchases by Non-Residents	-	-	-	-	-	-	(58,350,151)	-	-	-	(58,350,151)	58,350,151	-	
FOTAL INPUT	37,041,045	12,079,537	433,090,429	47,176,963	332,841,120	862,229,094	324,953,817	101,379,562	99,596,630	9,860,590	535,790,599	702,883,928	1,238,674,527	2,10
Imported Commodities	11,179,972	6,349,483	278,113,723	15,848,343	91,564,596	403,056,119	56,082,541	5,160,643	78,063,953	3,973,236	143,280,373	35,658,364	178,938,737	58
Taxes on Products	948,800	241,009	4,989,258	376,744	6,227,724	12,783,535	9,407,443	6,330	4,923,060	-	14,336,832	5,492,147	19,828,979	32
Subsidies on Products	1,042,691	425,904	2,961,454	374,156	4,256,706	9,060,911	3,298,724	-	-	-	3,298,724	-	3,298,724	12
Gross Value Added	75,737,702	88,938,944	182,942,971	27,818,132	429,724,996	805,162,745								
Compensation of Employee	13,908,678	4,906,893	51,851,314	19,591,013	170,079,405	260,337,302								
Other Net Taxes on Production	(163,604)	2,560,591	238,601	214,483	7,075,965	9,926,037								
Operating Surplus, Gross	61,992,628	81,471,460	130,853,055	8,012,636	252,569,626	534,899,405		1.7.1	1		÷.	100		
Consumption of Fixed Capital	4,663,065	8,014,599	28,815,494	2,027,529	60,723,268	104,243,955	-	1.2	1	_		1.		
Operating Surplus, net	57,329,563	73,456,861	102,037,561	5,985,107	191,846,359	430,655,451			- Ka 🖌					

123,864,829 107,183,070 896,174,927 90,846,026 856,101,730 2,074,170,582

TOTAL OUTPUT

Input-Output Analysis Variables



Input-Output Analysis Multiplier

• Mathematically, the vector of the simple output multiplier m is given by: $M = i' (I - A)^{-1}$ (1)

Note: M= the sum of Leontief inverse for all sectors

• The output multipliers that are adjusted for sectoral sizes can be derived as follows, (Miller and Blair, 2009),

$$\tilde{\mathbf{L}} = \mathbf{L} \langle \mathbf{f} \langle \mathbf{i}' \mathbf{f} \rangle^{-1} \rangle \mathbf{i}$$
(2)

• The value-added multipliers, which are adjusted for relative sectoral sizes, is straightforward and can be expressed as follows,

$$v^{\prime}=\pi^{\prime} L\langle f\langle i^{\prime} f\rangle^{(-1)} \rangle i=\pi^{\prime} L f$$
(3)

Note: The final demand vector, \mathbf{f} , consists of private consumption, government consumption, investment and exports.

Hypothetical Extraction Method(HEM)

The central idea of the HEM is that the hypothetical elimination of a complete sector in the economic system allows us to estimate the economy-wide contribution of the particular sector (Temurshoev and Oosterhaven, 2014).

Backward linkages index:

Measure the level of integration of construction industry in consuming output from other industries.

Forward linkages index:

Measure the level of integration of other industries in consuming output of construction industry.

A "key" industry

Industry with backward and forward indices greater than 1.



Hypothetical Extraction Method(HEM)

The *normalized* backward and forward linkages due to the complete extraction can be derived as follows:

$$\dot{B}_{i} = \frac{\mathbf{i}'\mathbf{x} - \mathbf{i}'\mathbf{x}_{l}^{-i}}{x_{i}} \quad \text{and}$$
$$\dot{F}_{j} = \frac{\mathbf{x}'\mathbf{i} - (\mathbf{x}_{b}^{-i})'\mathbf{i}}{x_{i}}$$

(3)

Where $\mathbf{i'x} - \mathbf{i'x}_l^{-i}$ and $\mathbf{x'i} - (\mathbf{x}_b^{-i})'$

i represent the full production and total input after extraction of the sector I.

Results

The degree of value added and output contribution of the construction sector.

Table 4.1: Output and Value-added Multiplier Aggregated Sectors Level

Output multiplier	VA multiplier	Output multiplier adjusted*	VA multiplier*	Size (percentage)
1.494	0.816	0.044	0.024	2.98
1.183	0.903	0.042	0.032	3.54
1.768	0.546	0.876	0.271	49.56
1.000	0.306	0.058	0.018	5.84
1.649	0.780	0.628	0.297	38.08
	Output nultiplier 1.494 1.183 1.768 1.000 1.649	Output VA multiplier VA 1.494 0.816 1.183 0.903 1.768 0.546 1.000 0.306 1.649 0.780	Output multiplier VA multiplier Output multiplier adjusted* 1.494 0.816 0.044 1.183 0.903 0.042 1.768 0.546 0.876 1.000 0.306 0.058 1.649 0.780 0.628	Output multiplier VA multiplier Output multiplier adjusted* VA multiplier* 1.494 0.816 0.044 0.024 1.183 0.903 0.042 0.032 1.768 0.546 0.876 0.271 1.000 0.306 0.058 0.018 1.649 0.780 0.628 0.297

*Note: take into account of final demand weighted size

The degree of value added and output contribution of the construction sector.

Table 4.2: Output and Value-added Multiplier Sub-sectors Level

Construction sub-sector	Output multiplier (1)	VA multiplier (2)	Output* multiplier adjusted (3)	VA multiplier* Adjusted (4)	
Residential	2.041	0.691	0.026	0.009	
Non Residential	2 022	0 672	0.0/1	0.01/	
NUT NESIGETILIAI	2.022	0.072	0.041	0.014	
Civil Engineering	1.980	0.634	0.035	0.011	
Special Trade					
Works	1.899	0.583	0.015	0.005	

*Note: take into account of final demand weighted size

Spill over effect

Table 4.3: Aggregated Backward and Forward linkages Sectors Level

Sector	Οι	utput	Value added(VA)		
	Backward	Forward	Backward	Forward	
	Linkages	Linkages	Linkages	Linkages	
	(1)	(2)	(3)	(4)	
Agriculture	0.75	1.81	0.60	1.20	
Mining & Quarrying	0.59	1.87	0.49	1.17	
Manufacturing	1.21	0.95	1.78	1.17	
Construction	1.62	0.88	1.76	0.86	
Services	1.05	1.16	0.97	1.04	



Table 4.4:Sub-sectors Backward and Forward Linkages

	Ou	tput	Value added(VA)		
sector	Backward Linkages	Forward Linkages	Backward Linkages	Forward Linkages	
Residential	1.70	0.73	1.74	0.74	
Non Residential	1.91	0.57	1.97	0.63	
Civil Engineering	1.80	0.71	1.98	0.87	
Special Trade Works	1.42	1.32	1.66	1.55	



Spill over effect

Table 4.5: Aggregated Sectors Results (extraction)

Sectors	Building & Construction (RM'000) (1)	Percentage (2)
Agriculture	120,273,210.28	6.24%
Mining & Quarrying	102,294,328.20	5.31%
Manufacturing	904,920,696.55	46.95%
Building & Construction	13,135,046.95	0.68%
Services	786,750,451.11	40.82%
Total	1,927,373,733.09	100.00%

Spill over effect

Table 4.6: Structure of Construction Sector Input Sources

Sectors	Residential	Non Residential	Civil Engineering	Special Trade Works	
	(percentage)	(percentage)	(percentage)	(percentage)	
Agriculture	6.04%	6.07%	6.08%	6.03%	
Mining and Quarrying	5.18%	5.19%	5.18%	5.16%	
Manufacturing	45.87%	46.04%	45.96%	45.71%	
Construction	3.59%	3.14%	3.35%	3.94%	
Services	39.31%	39.56%	39.44%	39.16%	
Total	100%	100%	100%	100%	



CHART 1 : CONSTRUCTION INPUT SOURCE (AVERAGE CONTRIBUTION)



Discussion





THE END

Thank you so much for your attention.

