

## The Construction of Sino-Singapore FTA under CAFTA3.0 Based on the GTAP Model

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### Introduction

This paper uses GTAP (Global Trade Analysis Project) model to simulate and analyze the economic impact and welfare changes on China and Singapore under the CAFTA (China and ASEAN Free Trade Area) framework.

### Tables

Table 1. Percentage change in imports and exports between China and Singapore<sup>1</sup>

year <sup>2</sup>	Export percentage <sup>3</sup>			Percentage of imports <sup>3</sup>		
	2010 <sup>3</sup>	2015 <sup>3</sup>	2020 <sup>3</sup>	2010 <sup>3</sup>	2015 <sup>3</sup>	2020 <sup>3</sup>
Sino-Singapore <sup>4</sup>	19.4 <sup>3</sup>	17.5 <sup>3</sup>	22.0 <sup>3</sup>	22.1 <sup>3</sup>	25.7 <sup>3</sup>	25.8 <sup>3</sup>

Table 2 Country classification under GTAP model<sup>1</sup>

Country or region <sup>2</sup>	Include scope <sup>3</sup>
China <sup>2</sup>	Chinese mainland, Hong Kong, Taiwan, Macau <sup>3</sup>
ASEAN <sup>2</sup>	Myanmar, Laos, Thailand, Vietnam, Cambodia, Indonesia, Brunei, Philippines, Malaysia, Singapore <sup>3</sup>
EU (28 countries) <sup>2</sup>	Austria, France, Italy, the Netherlands, Belgium, Luxembourg, Germany, Ireland, Slovakia, Denmark, the United Kingdom, Greece, Portugal, Spain, Finland, Sweden, Poland, Latvia, Romania and others <sup>3</sup>
North America <sup>2</sup>	USA, Canada, Mexico <sup>3</sup>
Japan/Korea <sup>2</sup>	<sup>3</sup>
India <sup>2</sup>	<sup>3</sup>
Australia/New Zealand <sup>2</sup>	<sup>3</sup>
Other countries <sup>2</sup>	<sup>3</sup>

Table 3 The impact of 5% tariff on Sino-Singapore FTA and other regions<sup>1</sup>

region <sup>2</sup>	Change in GDP (%) <sup>3</sup>	Change in terms of trade (%) <sup>3</sup>	Change in imports (%) <sup>3</sup>	Change in exports (%) <sup>3</sup>	Change in benefits (US\$ million) <sup>3</sup>
China <sup>2</sup>	-0.37 <sup>3</sup>	-0.55 <sup>3</sup>	1.48 <sup>3</sup>	1.03 <sup>3</sup>	1742.19 <sup>3</sup>
Singapore <sup>2</sup>	1.91 <sup>3</sup>	1.72 <sup>3</sup>	1.83 <sup>3</sup>	1.1 <sup>3</sup>	15169.76 <sup>3</sup>
ASEAN <sup>2</sup>	-0.23 <sup>3</sup>	-0.12 <sup>3</sup>	-0.27 <sup>3</sup>	-0.22 <sup>3</sup>	-1306.74 <sup>3</sup>
NAFTA <sup>2</sup>	-0.08 <sup>3</sup>	-0.02 <sup>3</sup>	-0.14 <sup>3</sup>	-0.09 <sup>3</sup>	-545.52 <sup>3</sup>
EU <sup>2</sup>	-0.1 <sup>3</sup>	0.01 <sup>3</sup>	-0.12 <sup>3</sup>	-0.09 <sup>3</sup>	-199.55 <sup>3</sup>
Other countries <sup>2</sup>	-0.17 <sup>3</sup>	-0.06 <sup>3</sup>	-0.24 <sup>3</sup>	-0.19 <sup>3</sup>	-3285.59 <sup>3</sup>

Table 4 Changes in industrial output caused by a 5% tariff level in Sino-Singapore FTA<sup>1</sup>

Country <sup>2</sup>	China <sup>3</sup>	Singapore <sup>3</sup>	ASEAN <sup>3</sup>	EU <sup>3</sup>	NAFTA <sup>3</sup>	Other countries <sup>3</sup>
natural resources <sup>2</sup>	-0.13 <sup>3</sup>	-1.09 <sup>3</sup>	0.02 <sup>3</sup>	-0.05 <sup>3</sup>	-0.04 <sup>3</sup>	-0.01 <sup>3</sup>
Processed foods <sup>2</sup>	0.59 <sup>3</sup>	-0.05 <sup>3</sup>	-0.23 <sup>3</sup>	-0.05 <sup>3</sup>	-0.03 <sup>3</sup>	-0.07 <sup>3</sup>
Textile and clothing industry <sup>2</sup>	1.24 <sup>3</sup>	-2.82 <sup>3</sup>	-0.65 <sup>3</sup>	-0.35 <sup>3</sup>	-0.26 <sup>3</sup>	-0.28 <sup>3</sup>
Cereals and crops <sup>2</sup>	1.53 <sup>3</sup>	-1.68 <sup>3</sup>	-0.12 <sup>3</sup>	-0.15 <sup>3</sup>	-0.71 <sup>3</sup>	-0.16 <sup>3</sup>
Animal husbandry and meat products <sup>2</sup>	0.08 <sup>3</sup>	-1.25 <sup>3</sup>	0.07 <sup>3</sup>	-0.04 <sup>3</sup>	0.05 <sup>3</sup>	0.02 <sup>3</sup>
light industry <sup>2</sup>	0.17 <sup>3</sup>	-2.62 <sup>3</sup>	0.57 <sup>3</sup>	0.12 <sup>3</sup>	0.17 <sup>3</sup>	0.27 <sup>3</sup>
heavy industry <sup>2</sup>	-0.75 <sup>3</sup>	1.51 <sup>3</sup>	-0.15 <sup>3</sup>	-0.04 <sup>3</sup>	0.01 <sup>3</sup>	-0.05 <sup>3</sup>
Public utilities <sup>2</sup>	0.11 <sup>3</sup>	0.48 <sup>3</sup>	-0.1 <sup>3</sup>	-0.01 <sup>3</sup>	-0.01 <sup>3</sup>	-0.03 <sup>3</sup>
Transportation & Communications <sup>2</sup>	-0.11 <sup>3</sup>	-0.12 <sup>3</sup>	0.08 <sup>3</sup>	0.05 <sup>3</sup>	0.02 <sup>3</sup>	0.05 <sup>3</sup>
Other service industries <sup>2</sup>	-0.04 <sup>3</sup>	0.09 <sup>3</sup>	0.05 <sup>3</sup>	0.01 <sup>3</sup>	0.01 <sup>3</sup>	0.02 <sup>3</sup>

### Figures

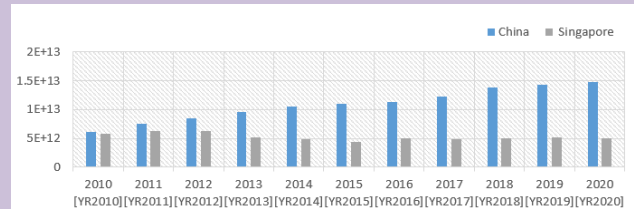


Figure 1. Changes in GDP of China and Singapore in recent 10 years

TRENDS OF IMPORT AND EXPORT OF CHINA AND SINGAPORE

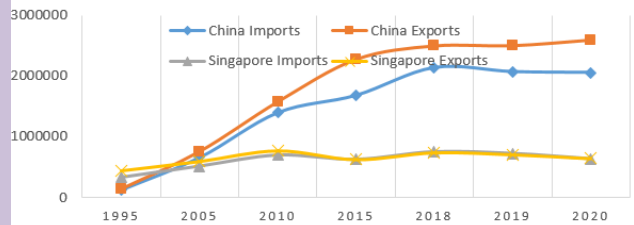


Figure 2. Changes in imports and exports between China and Singapore<sup>1</sup>

### Tables

Table 5 Macroeconomic impact of zero tariffs on the Sino-Singapore FTA and various regions<sup>1</sup>

region <sup>2</sup>	Change in GDP (%) <sup>3</sup>	Change in terms of trade (%) <sup>3</sup>	Change in imports (%) <sup>3</sup>	Change in exports (%) <sup>3</sup>	Change in benefits (US\$ million) <sup>3</sup>
China <sup>2</sup>	0.03 <sup>3</sup>	-0.41 <sup>3</sup>	4.84 <sup>3</sup>	3.26 <sup>3</sup>	9429.88 <sup>3</sup>
Singapore <sup>2</sup>	2.85 <sup>3</sup>	2.47 <sup>3</sup>	6.13 <sup>3</sup>	3.53 <sup>3</sup>	22143.25 <sup>3</sup>
ASEAN <sup>2</sup>	-0.70 <sup>3</sup>	-0.37 <sup>3</sup>	-0.92 <sup>3</sup>	-0.72 <sup>3</sup>	-3519.42 <sup>3</sup>
NAFTA <sup>2</sup>	-0.31 <sup>3</sup>	-0.15 <sup>3</sup>	-0.53 <sup>3</sup>	-0.28 <sup>3</sup>	-4289.69 <sup>3</sup>
EU <sup>2</sup>	-0.30 <sup>3</sup>	0.03 <sup>3</sup>	-0.35 <sup>3</sup>	-0.23 <sup>3</sup>	-2427.44 <sup>3</sup>
Other countries <sup>2</sup>	-0.45 <sup>3</sup>	-0.22 <sup>3</sup>	-0.66 <sup>3</sup>	-0.48 <sup>3</sup>	-9809.09 <sup>3</sup>

Table 6 The impact of zero tariff on macroeconomics of Sino-Singapore FTA and various regions<sup>1</sup>

region <sup>2</sup>	China <sup>3</sup>	Singapore <sup>3</sup>	ASEAN <sup>3</sup>	EU <sup>3</sup>	NAFTA <sup>3</sup>	Other countries <sup>3</sup>
Cereals and crops <sup>2</sup>	1.5 <sup>3</sup>	-2.28 <sup>3</sup>	-0.05 <sup>3</sup>	-0.18 <sup>3</sup>	-0.7 <sup>3</sup>	-0.14 <sup>3</sup>
Animal husbandry and meat products <sup>2</sup>	0.19 <sup>3</sup>	-2.45 <sup>3</sup>	0.06 <sup>3</sup>	-0.07 <sup>3</sup>	0.04 <sup>3</sup>	0.01 <sup>3</sup>
natural resources <sup>2</sup>	-0.33 <sup>3</sup>	-1.77 <sup>3</sup>	0.08 <sup>3</sup>	-0.13 <sup>3</sup>	-0.09 <sup>3</sup>	-0.03 <sup>3</sup>
Processed foods <sup>2</sup>	0.77 <sup>3</sup>	-0.29 <sup>3</sup>	-0.08 <sup>3</sup>	-0.08 <sup>3</sup>	-0.06 <sup>3</sup>	-0.08 <sup>3</sup>
Textile and clothing industry <sup>2</sup>	1.22 <sup>3</sup>	-4.54 <sup>3</sup>	-0.51 <sup>3</sup>	-0.25 <sup>3</sup>	-0.08 <sup>3</sup>	0 <sup>3</sup>
light industry <sup>2</sup>	0.18 <sup>3</sup>	-4.1 <sup>3</sup>	0.95 <sup>3</sup>	0.27 <sup>3</sup>	0.36 <sup>3</sup>	0.56 <sup>3</sup>
heavy industry <sup>2</sup>	-1.01 <sup>3</sup>	1.96 <sup>3</sup>	-0.63 <sup>3</sup>	-0.11 <sup>3</sup>	-0.03 <sup>3</sup>	-0.24 <sup>3</sup>
Public Utilities and Construction <sup>2</sup>	0.43 <sup>3</sup>	1.3 <sup>3</sup>	-0.45 <sup>3</sup>	-0.13 <sup>3</sup>	-0.15 <sup>3</sup>	-0.17 <sup>3</sup>
Transportation & Communications <sup>2</sup>	-0.1 <sup>3</sup>	-0.12 <sup>3</sup>	0.17 <sup>3</sup>	0.08 <sup>3</sup>	-0.01 <sup>3</sup>	0.07 <sup>3</sup>
Other service industries <sup>2</sup>	-0.03 <sup>3</sup>	0.06 <sup>3</sup>	0.13 <sup>3</sup>	-0.01 <sup>3</sup>	-0.01 <sup>3</sup>	0.01 <sup>3</sup>

## Tables

Table 7 Comparison of simulation results of scenarios 1 and 2<sup>1</sup>

country <sup>2</sup>	Change in GDP (%) <sup>2</sup>		Change in terms of trade (%) <sup>2</sup>		Change in imports (%) <sup>2</sup>		Change in exports (%) <sup>2</sup>		Change in benefits (US\$ million) <sup>2</sup>	
	Scenario <sup>2</sup>		Scenario <sup>2</sup>		Scenario <sup>2</sup>		Scenario <sup>2</sup>		Scenario <sup>2</sup>	
	one <sup>2</sup>	two <sup>2</sup>	one <sup>2</sup>	two <sup>2</sup>	one <sup>2</sup>	two <sup>2</sup>	one <sup>2</sup>	two <sup>2</sup>	one <sup>2</sup>	two <sup>2</sup>
China <sup>2</sup>	-0.38 <sup>2</sup>	0.03 <sup>2</sup>	-0.56 <sup>2</sup>	-0.41 <sup>2</sup>	1.47 <sup>2</sup>	4.84 <sup>2</sup>	1.02 <sup>2</sup>	3.26 <sup>2</sup>	1742.18 <sup>2</sup>	9429.88 <sup>2</sup>
Singapore <sup>2</sup>	1.90 <sup>2</sup>	2.85 <sup>2</sup>	1.71 <sup>2</sup>	2.47 <sup>2</sup>	1.82 <sup>2</sup>	6.13 <sup>2</sup>	1.09 <sup>2</sup>	3.53 <sup>2</sup>	15169.75 <sup>2</sup>	22143.25 <sup>2</sup>
ASEAN <sup>2</sup>	-0.24 <sup>2</sup>	-0.70 <sup>2</sup>	-0.13 <sup>2</sup>	-0.37 <sup>2</sup>	-0.28 <sup>2</sup>	-0.92 <sup>2</sup>	-0.23 <sup>2</sup>	-0.72 <sup>2</sup>	-1306.75 <sup>2</sup>	-3519.42 <sup>2</sup>
NAFTA <sup>2</sup>	-0.09 <sup>2</sup>	-0.31 <sup>2</sup>	-0.03 <sup>2</sup>	-0.15 <sup>2</sup>	-0.15 <sup>2</sup>	-0.53 <sup>2</sup>	-0.10 <sup>2</sup>	-0.28 <sup>2</sup>	-545.53 <sup>2</sup>	-4289.69 <sup>2</sup>
EU <sup>2</sup>	-0.11 <sup>2</sup>	-0.30 <sup>2</sup>	0.00 <sup>2</sup>	0.03 <sup>2</sup>	-0.13 <sup>2</sup>	-0.35 <sup>2</sup>	-0.10 <sup>2</sup>	-0.23 <sup>2</sup>	-199.56 <sup>2</sup>	-2427.44 <sup>2</sup>
The rest <sup>2</sup>	-0.18 <sup>2</sup>	-0.45 <sup>2</sup>	-0.07 <sup>2</sup>	-0.22 <sup>2</sup>	-0.25 <sup>2</sup>	-0.66 <sup>2</sup>	-0.20 <sup>2</sup>	-0.48 <sup>2</sup>	-3285.60 <sup>2</sup>	-9809.09 <sup>2</sup>

Table 8 Comparison of simulated output changes in Sino-Singapore FTA<sup>1</sup>

Country/Region <sup>2</sup>	China <sup>2</sup>		Singapore <sup>2</sup>	
	Scenario one <sup>2</sup>	Scenario two <sup>2</sup>	Scenario one <sup>2</sup>	Scenario two <sup>2</sup>
Cereals and crops <sup>2</sup>	1.52 <sup>2</sup>	1.51 <sup>2</sup>	-1.69 <sup>2</sup>	-2.27 <sup>2</sup>
Animal husbandry and meat products <sup>2</sup>	0.07 <sup>2</sup>	0.20 <sup>2</sup>	-1.26 <sup>2</sup>	-2.44 <sup>2</sup>
natural resources <sup>2</sup>	-0.14 <sup>2</sup>	-0.32 <sup>2</sup>	-1.10 <sup>2</sup>	-1.76 <sup>2</sup>
Processed foods <sup>2</sup>	0.58 <sup>2</sup>	0.78 <sup>2</sup>	-0.06 <sup>2</sup>	-0.28 <sup>2</sup>
Textile and clothing industry <sup>2</sup>	1.23 <sup>2</sup>	1.23 <sup>2</sup>	-2.83 <sup>2</sup>	-4.53 <sup>2</sup>
light industry <sup>2</sup>	0.16 <sup>2</sup>	0.19 <sup>2</sup>	-2.63 <sup>2</sup>	-4.09 <sup>2</sup>
heavy industry <sup>2</sup>	-0.76 <sup>2</sup>	-1.00 <sup>2</sup>	1.50 <sup>2</sup>	1.97 <sup>2</sup>
Public Utilities and Construction <sup>2</sup>	0.10 <sup>2</sup>	0.44 <sup>2</sup>	0.47 <sup>2</sup>	1.31 <sup>2</sup>
Transportation & Communications <sup>2</sup>	-0.12 <sup>2</sup>	-0.09 <sup>2</sup>	-0.13 <sup>2</sup>	-0.11 <sup>2</sup>
Other service industries <sup>2</sup>	-0.05 <sup>2</sup>	-0.02 <sup>2</sup>	0.08 <sup>2</sup>	0.07 <sup>2</sup>

## Conclusion

Conclusions show that China and Singapore complement each other in terms of labor resources, capital and technology; Under the CAFTA framework, the economic aggregate, GDP, the scale of mutual trade can be improved and further produce trade creation and trade transfer effects; Under the CAFTA framework, the Sino-Singapore FTA will significantly affect the development of China's advantageous industries. So, it can be predicted that the development of Sino-Singapore FTA will be effectively promoted under the CAFTA framework.