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Sectors: An Interregional CGE Analysis**

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THE IMPACT OF TRADE COSTS IN INDONESIAN AGRI-FOOD SECTORS: AN INTERREGIONAL CGE ANALYSIS

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ABSTRACT

Indonesia is a Developing Country (DC) where more than 13 percent of her population live below the poverty line and approximately half of all households are near the national poverty line. While at the national level, Indonesia has sufficient food production to be self supporting, not all regions have the same endowment of agricultural productive capacity which can result in regional shortages. This study examines the extent to which a reduction in Indonesia's trade and transport margins can reduce interregional agri-food prices and thus help improve food security. As few studies explore the impact of intra-national trade barriers; this paper makes a unique contribution to this small, but important literature.

Findings suggest that reducing trade margin or "soft infrastructure" margins is the more effective approach to improving economic outcomes across Indonesia's regions. Further, while reducing trade margins improved the poverty incidence for residence in all regions, the primary beneficiaries of this investment were those that live in urban areas. Results will be of interest to those interested in supporting the welfare of individuals in developing countries, and particularly living in island nations.

MOTIVATION

At the national level, Indonesia has sufficient food production (Apriyantono, 2009) to be self supporting, but at the regional level not all regions have the same endowment of agricultural productive capacity which can create regional shortages. The difference in regional production capacity and variable quality transportation infrastructure, contributes to regional variations in food prices and per capita food consumption. In turn, these high and variable food price differences have contributed to a lumpy distribution of the incidence of both food insecurity and poverty across Indonesia's regions.

Existing high interregional price differences in agri-food markets suggest the presence of variable internal trade costs serve as effective barriers to interregional trade. Given the important role of agri-food markets in both food security and income generation for rural households, these price differences can have significant welfare impacts on both producers and consumers. Reducing the costs of trade between Indonesia's various regions could facilitate interregional trade. Trade costs consist of various components which vary in their welfare and distribution effects and, as such, are likely to yield different effects on regional welfare.

OBJECTIVE

The objective of this study is to examine the extent to which a reduction in Indonesia's trade costs (trade margin and transport margin) can reduce interregional agri-food prices and, in doing so, facilitate improved food security.

DATA AND METHODS

An interregional SAM (IRSAM) base CGE model is used to separately analyze the impacts of trade and transport margins on trade flow within the Indonesian Economy. Trade costs consist of all costs incurred in getting a good to the final user other than the marginal cost of producing the good itself (De, 2006) including transportation costs, contract enforcement costs, and location distribution costs (wholesale and retail). As these costs vary in their welfare and distribution effects, in this study we disaggregate trade costs to separately evaluate transport costs (as part of the transport margin) and local distribution costs (as part of the trade margin).

An Indonesian IRSAM constructed by Resosudarmo et al. (2009) was modified for this analysis. This IRSAM divides the economic activities for each of Indonesia's five major economic regions into 35 production sectors, 6 labor classifications, 2 types of capital, 2 types of households, local government and companies, and maintains other national accounts. In this analysis, original trade and transportation margins were netted out and isolated into separate margin accounts unique to each industry and region.

Interregional trade flow simulations are performed using the modified CGE model and the simulated output is subsequently evaluated relative to the baseline condition. These simulations were then used to independently examine the economic impact of a reduction in trade or transport margins on a variety of micro and macroeconomic variables to estimate policy induced trade flow and welfare impacts in each region.

RESULTS

The impact of trade costs under three scenarios is considered: (1) reduce trade margin to 50% of initial baseline value for all-agrifood commodities (SIM1); (2) reduce transport margin to 50% of initial baseline value for all agri-food commodities (SIM2); and (3) reduce transport margin to 10% of initial baseline value for all (not just agri-food) commodities (SIM3). Simulation results are presented in Table 1; Table 2 presents the outcomes of regressions that examine consumer WTP for organic and locally grown fruit and vegetables.

As expected, the simulation results varied depending upon which type of trade costs were adjusted, in which sector the trade cost was applied to, and the magnitude of the trade cost change.

SIM1: GDP in all regions was found to be higher than in the baseline analysis; this result indicates that reducing trade margins is a potentially effective means to improve Indonesia's economic outcomes, regardless of whether the region is a net importer or exporter of agri-food goods.

SIM2: For all regions except Sulawesi, regional GDP decreases from its baseline. This finding is a stark contrast relative to the SIM1 results. Even when conditioned on the relative magnitude of the size of trade, and transportation margins are taken into consideration, these results suggest that reducing trade, or "soft infrastructure" margins, offer the more effective approach to improve economic outcomes across Indonesia's regions.

SIM3: This scenario reflects a 'best case' outcome for Indonesia's economy should significant resources be directed to improving the country's hard infrastructure. Under SIM3, in three of Indonesia's five regions, regional GDP improves when transportation cost is reduced.

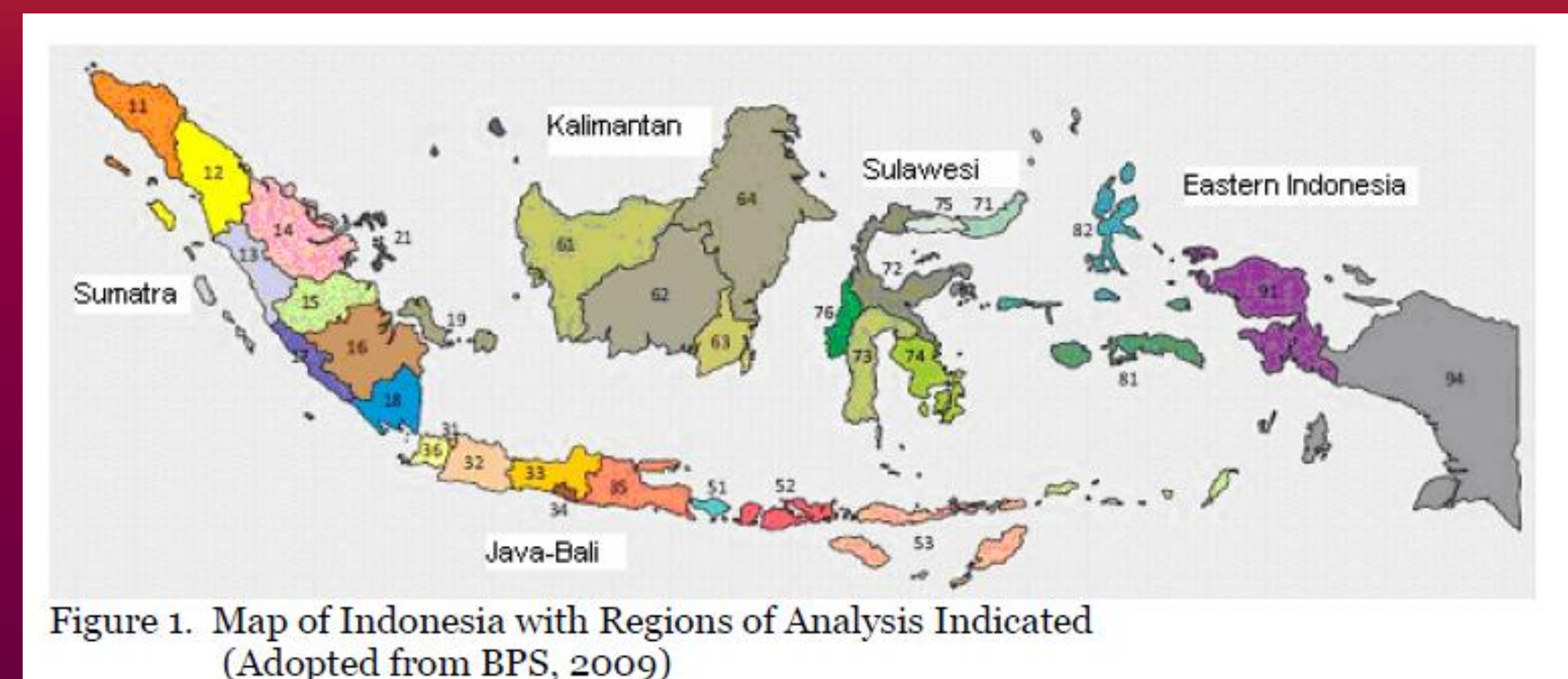


Figure 1. Map of Indonesia with Regions of Analysis Indicated (Adopted from BPS, 2009)

Table 1. Summary of Trade Cost Simulations

	Policy Shock	Magnitude	Sector
Simulation 1 (SIM1)	Reduces trade margin	to 50% of the base value	Agri-food sectors
Simulation 2 (SIM2)	Reduces transport margin	to 50% of the base value	Agri-food sectors
Simulation 3 (SIM3)	Reduces transport margin	to 10% of the base value	All sectors

Table 2: Comparison of Macroeconomic Outcomes disaggregated by Region and Their Ratio Change from Baseline across All Simulations

	SIM1				
	Sumatra	Java-Bali	Kalimantan	Sulawesi	Eastern Ind.
Private Consumption	253.68	903.61	64.14	55.09	44.12
Ratio Change	0.12	3.43	1.29	1.68	1.44
GDP at Market Price	550.19	1576.23	245.16	102.22	101.85
Ratio Change	1.14	1.38	1.09	1.26	1.03
	SIM2				
	Sumatra	Java-Bali	Kalimantan	Sulawesi	Eastern Ind.
Private Consumption	165.18	287.19	50.46	36.26	32.94
Ratio Change	0.08	1.09	1.01	1.11	1.08
GDP at Market Price	475.78	1100.27	219.07	85.53	90.5
Ratio Change	0.98	0.96	0.97	1.06	0.92
	SIM3				
	Sumatra	Java-Bali	Kalimantan	Sulawesi	Eastern Ind.
Private Consumption	253.42	902.12	64.12	55.04	44.06
Ratio Change	0.12	3.42	1.29	1.68	1.44
GDP at Market Price	549.85	1574.35	245.11	102.17	101.88
Ratio Change	1.14	1.38	1.09	1.26	1.03

Note:

Ratio Change reflects the increase or decrease from the values obtained during the baseline analysis. It is calculated by dividing its new level value by its baseline value.

CONCLUSIONS & FUTURE RESEARCH

This study demonstrates how trade costs can affect interregional trade within a region and consequently affect market integration and poverty alleviation. Preliminary results varied and were dependent on the type and degree that trade costs were adjusted. Reducing the trade margin by a given percent had a greater positive impact on regional GDP than reducing the transport margin by the same percent. Findings suggest that reducing trade margin or "soft infrastructure" margin is the more effective approach to improving economic outcomes across Indonesia's regions. Also, reducing trade margin improved the poverty incidence for residence in all regions; however, the primary beneficiaries of this investment were those live in urban areas.

There is need and much opportunity for additional research on this topic. We suggest that future research explores the impact that requiring a means to pay for each trade cost reduction (a compensation scheme) has on the anticipated economic benefits of reducing these costs. As a starting point, an instrument could be introduced that imposes a higher federal tax on some targeted (or all) sectors to finance the infrastructure improvements. This analysis could explore the relative welfare impacts on different stakeholders in different regions as a result of alternative compensation options. Secondly, this analysis considers only domestic trade costs and assumes that international trade costs are embedded in the prices 'Rest of World' (RoW) commodities. While the impact of international trade costs will have a more muted impact on interregional trade flows, additional work to explicitly include export and import trade margins would permit a more holistic examination of the impact of trade costs on Indonesia.