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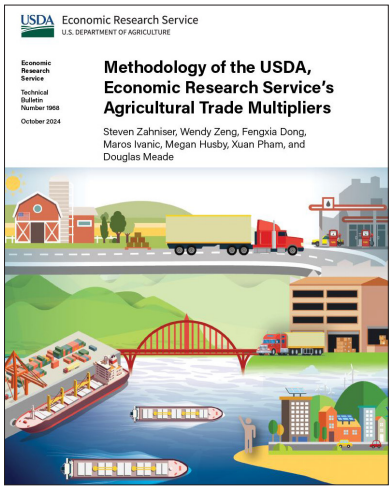
Methodology of the USDA, Economic Research Service's Agricultural Trade Multipliers

Steven Zahniser, Wendy Zeng, Fengxia Dong, Maros Ivanic, Megan Husby, Xuan Pham, and Douglas Meade



What is the Issue?

USDA, Economic Research Service (ERS) produces the Agricultural Trade Multipliers (ATMs)—a data product providing annual estimates of the economic output and number of jobs supported by U.S. agricultural trade. The ATMs are used by government agencies, academics, and other stakeholders to gauge the effect that U.S. agricultural trade has on the farm and nonfarm sectors of the U.S. economy and the contribution of U.S. agricultural exports to employment and output. In 2021, USDA, ERS created a new program to estimate the ATMs and revised its ATM methodology. Supply-use tables (made up of supply tables and use tables) are a key input for the new program. The supply tables detail the domestically produced goods and services and imports available for domestic use in the economy, while the use tables show how this supply is used across the U.S. economy in terms of intermediate inputs, final demand, and value added.

What Did the Study Find?

The ATMs rely on an empirical approach called "input-output analysis" that explores the quantity of inputs needed to obtain one unit of output. To quantify the economic activity and employment supported by U.S. agricultural exports, the new computer program used to estimate the ATMs draws upon multiple data sources. These include trade data from the U.S. Department of Commerce's Bureau of the Census, supply-use tables from the U.S. Department of Commerce's Bureau of Economic Analysis, farm sector cash receipts data from USDA, ERS, and employment data from the U.S. Department of Labor's Bureau of Labor Statistics and from USDA's Agricultural Resource Management Survey (ARMS). Together, these data are used to calculate the number of jobs and the total value of the economic activity supported by each dollar of U.S. agricultural exports. The employment and output estimates are calculated separately for 124 agricultural product groups, from soybeans to essential oils.

How Was the Study Conducted?

The USDA, ERS researchers who wrote the new computer program for calculating the ATMs also constructed an annotated version. The notes to the computer program were then used to write a description in nontechnical language of how the program works—including the main steps taken by the program to generate the ATMs, the data sources used in the ATM model, and how these data were utilized. The new program contains several features:

- It directly extracts most of the data from the publicly available Federal Government databases used in the ATM model;
- It is written in the R Language, an open source and free programming language for statistical computing and graphics that can run on a variety of operating systems and computing platforms; and
- The steps for generating the multipliers are all contained within a single R program.

These features were incorporated in the ATMs to lower the probability of human error, increase the calculating and processing speed, and provide a platform to conduct subsequent research using the multipliers that would allow for better replicability and transparency of the model.