Use of RIMS II Multipliers—COVID-19

BEA's Regional Input-Output Modeling System (RIMS II) provides a tool that can be used in estimating the economic impact of **demand** shocks on total output, value added, employment, and earnings. The model produces multipliers that are used in economic impact studies to measure the total impact of a wide range of projects on a region. RIMS II multipliers have been used in certain instances, where the basic structure of the local economy remained intact, to measure the economic impact of natural or man-made disasters. Users must identify and quantify the initial change in final demand. Unlike macro-econometric models, the static nature of RIMS II limits its usefulness in estimating the impacts of changes in business structures or operations, changes in household consumption patterns, or changes in government tax and expenditure policies.

RIMS II multipliers are **not** designed to estimate the impact of **supply** shocks to the economy.

RIMS II makes several assumptions about how businesses and households operate. These assumptions work well when fundamental relationships and structures remain stable in the economy. However, during periods of economic instability, such as during the COVID-19 outbreak, these assumptions may no longer be applicable.

Major assumptions in the RIMS II model include:
- Fixed and uniform industry production functions: All businesses in the same industry use the same mix of inputs, do not substitute supplies, and exhibit constant returns to scale (i.e., must double inputs to double output).
- No supply constraints: Businesses can purchase all the inputs they need without impacting prices.
- All households have the same spending patterns, which do not change: Changes in income result in increased/decreased spending across all categories in fixed proportions.

Events contrary to those assumptions due to economic disruptions from COVID-19 include:
- Certain goods and services for final consumption are not available or in limited supply.
- Certain inputs required for production (labor and intermediate goods and supplies) are unavailable or in short supply.
- Households have changed their spending patterns, either by choice, government regulation, shortages, or because businesses have closed.
- There are also non-economic changes to household and business behavior.

RIMS II is a backward linkage model, meaning it measures the economic impact of an increase in the demand for inputs resulting from an increase in final demand. RIMS II produces two types of multipliers: Type I multipliers account for the interindustry effect of a change in final demand. Type II multipliers account for both the interindustry effect and the impact on household spending of a change in final demand.

Special Topics in the Use of RIMS II Multipliers for COVID-19 Impacts

Households

RIMS II assumes that household spending patterns are fixed and changes in income are consumed on goods and services in fixed proportions. These assumptions do not hold up during the COVID-19 outbreak, as household spending patterns have changed as the result of shortages, government restrictions on business activities, and basic disruptions to normal household behavior and activities. Thus, users of RIMS II should only consider using Type I multipliers in assessing the economic impact of final demand changes due to COVID-19. In specific industries, users may be able to identify the final demand change associated with a change in household spending (on restaurants and entertainment, for example) and apply Type I multipliers.

Federal Cash Payments

The impact of federal cash payments to consumers is outside the scope of RIMS II unless the user can identify how households will spend the money. Those payments may be used in different ways. The multipliers for households, however, will estimate impacts assuming a fixed pattern of purchases unaffected by COVID-19. If the payments support existing spending, such as rent or utilities, there will be little additional impact on the regional economy.

Retail

Retail spending in the RIMS II model requires special treatment because retail sales cannot be directly applied to the retail multipliers. Only the retail margin can be applied to the RIMS II multipliers. This treatment recognizes that only the margin from the selling of goods and services is available to pay for retail overhead and labor. In the case of COVID-19 shocks, it may be more accurate to limit measuring impacts to lost wages or declines in employment using the RIMS II Type I direct-effect multipliers.

Airlines

RIMS II can be used to measures the impact of the airlines' reductions in operations on its suppliers using Type I multipliers. Because RIMS II is a backward linkage model, it cannot measure the impact of the reduction in airline travel on businesses whose employees cannot travel or on hotels that have fewer customers.

Supply Shortages

RIMS II assumes that businesses and households can freely purchase the goods and services they require. For example, if the multipliers are used to estimate the impact of increased medical spending on testing, the model assumes that the economy can supply the necessary tests and staff to fulfill the demand increase.

Business Closures

The impact of government-mandated or voluntary business closures can be partially measured with the model's Type I multipliers. RIMS II estimates are limited to the impact of a business's closure on its suppliers. The model assumes that a business that closes will reduce its purchases of raw materials, services, and labor. However, the model may overestimate the decrease in some purchases, such as rent, and not recognize deferred spending on services such as accounting services. The model is more accurate for expenses directly tied to production, such as construction supplies or food purchased by restaurants. Supply shocks resulting from business closures are not in the scope of the model.

Medical Spending

Medical spending in an event like COVID-19 will not match the model's results because supply chain shortages in production inputs make it difficult for manufacturers and other businesses to increase production in the short term. The model assumes that all demand for goods and services can be supplied. Equipment, supplies, and other inputs may not be available, and the RIMS II model is not designed to measure these supply shocks.