Monthly Labor Review

BLS

March 2020

Combining data to improve import and export price indexes

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With trade growing and fewer companies to sample from, researchers are considering incorporating part of the 2.0 million records of administrative data on unit values available. In "Unit values for import and export price indexes—a proof of concept" (National Bureau of Economic Research, Working Paper 26373, October 2019), authors Don Fast and Susan Fleck look into incorporating unit value data into the import and export price indexes. By proving that it can be done without losing quality, Fast and Fleck shows that intergrading the unit value data would expand coverage and create more detailed import and export price indexes.

One of the challenges of merging these data is that unit value data are known to have a substitution bias. Therefore, for the 2015–16 period, the authors focused on two products— dairy and vegetables exports, because they are frequently traded and homogenous. These two products would then help identify other homogenous products.

Currently, the U.S. Bureau of Labor Statistics Import and Export Indexes (MXPI) use a matched model approach linking specific products over time to create the indexes. The authors turned to the Törnqvist index to test adding unit values to the current indexes. The model reduces substitution bias and accounts for item turnover (new, disappearing, or a variety of products) and eliminates a criticism of the matched model (that it only tracks a singular item and does not consider replacements). The authors then tested how well the new index would fare compared with a benchmark index.

The authors used six key specifications (price-determining characteristics) to build their model. These variables included related or arms-length trade, an establishment identification number (EIN), a zip code, state of origin, a harmonized system code, domestic port of export, a country of destination, and a unit of measure.

With a model built, Fast and Fleck tested dairy and vegetables exports data for unit value bias. Their tests results showed that with more detailed records, intra-item substitutability improved and unit value bias of the goods was reduced. After evaluating for homogeneity, the authors compared the model results with the benchmark price indexes by testing for root mean square and absolute error. The biggest takeaway when they compared the unit value index with the benchmark index was tracking for accuracy. In the end, the more detailed the EIN, the more accurate the data.

In the end, the results were promising, and with further research, unit value data could be blended with collected data for creating more robust indexes. The next step is to use a wider range of years (2012 to 2017) and use the discussed prototype to test 52 import and 50 export U.S. Bureau of Economic end use categories that were categorized as homogenous as part of the authors' research.