Measuring Import And Export Price Movements With Administrative Trade Data

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Questions

The International Price Program (IPP) is researching the use of alternative data and methods to calculate price indexes. Like other BLS price programs, IPP uses a matched item model concept to measure price change. The current representative sample of businesses and items in import and export price indexes are a fraction of all international trade transactions. Presently, Customs (imports) and Census (exports) provide the census of all trade transactions to BLS for sampling purposes only. For this study, IPP is researching the question "Can trade transaction data be used in lieu of business survey data to produce detailed export price indexes?", given rising costs and declining response rates in direct survey collection. We will select export index groups, address issues of unit value bias (i.e., price change due to change in product mix rather than market factors), identify tests to compare the quality of results, and consider substitution bias and quality change.

Methods

Currently importers and exporters are surveyed to collect price data for over 20,000 products monthly. The import and export price indexes are aggregated using a modified Laspeyres formula beginning with sample-weighted item price changes for each company||10-digit detailed Harmonized System (HS) commodity classification group. The method proposed in this research, in contrast, calculates the classification group indexes by aggregating trade-weighted average prices of transactions (also called unit values) for unique items using a Tornqvist formula. These unique items are constructed by defining "keys" at the 10-digit HS trade category which include numerous trade transaction characteristics, such as employer ID number (EIN), zip code of U.S. Principal Party in Interest (USPPI), state of export, U.S. port, country to which exported. These item key definitions remain constant over time and new unique items in each key are added when new transactions occur. In essence these unique items are proxies for matched items because they are built at such a granular level that they are homogeneous.

We run a variety of statistical tests using the prices from these item keys to determine whether unit value bias exists in the price distributions over time. If not, then these items are candidates for use in creating price indexes. Subsequently, an analysis of Laspeyres and Tornqvist indexes will be done to compare the quality of results and gauge the impact on substitution bias. Given the focus on more homogenous product areas, it is expected that the index quality improvements due to minimization of substitution bias will outweigh the limitations to quality adjust.

Data

This research uses all export trade transactions reported by exporters to Census on a real-time basis for 2013-2016. These transactions report HS commodity classification, dollar value, quantity, company, and trade information. BLS regularly receives monthly data files on a 6-week lag for sampling purposes. The research using this Census data has been approved by Census. A preliminary determination was made to focus on more homogenous HS commodity groups with low survey response in published indexes.

Preliminary Results

Dairy products and eggs and **Vegetables and vegetable preparations and juices** (BEA 00301 and 00303, respectively) were identified as having more homogenous HS commodity groups and facing low response rates. If the item key research results in feasible indexes, the volume of price quotes could permit publication of more and more-detailed indexes. The following table provides a snapshot of annual trade in 2016 for these product categories:

Export Indexes, BEA End Use	No. of annual trade transactions	No. of EINs with > 50 trades & > $100k traded	No. 10-digit HS product categories	Annual trade $ value
Dairy products & eggs	82,100	220	41	$3.8 billion
Vegetables and vegetable preparations and juices	392,000	950	161	$6.9 billion