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Accounting for Firm Heterogeneity within U.S. Industries: Extended Supply-Use Tables and Trade in Value Added using Enterprise and Establishment Level Data

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This paper will present proof-of-concept trade-in-value added (TiVA) statistics estimated from extended supply-use tables (SUTs) for the United States for 2005 and 2012 that account for firm heterogeneity. The tables used to estimate the TiVA statistics extend recently-introduced supply-use tables for the United States by disaggregating the components of supply and use by multinational and other firms. We also present preliminary output from a data linking project between Bureau of Economic Analysis (BEA) and the U.S. Census Bureau on the U.S. semiconductor and other electronic components manufacturing industry to show how different firm characteristics account for heterogeneity within industries in an extended SUT framework. Recent research has shown both the advantages of measuring trade on a value added basis when analyzing bilateral trade flows and the dominance of multinational enterprises in U.S. trade in goods and services.

The extended SUTs will extend work done by Fetzer, Howells, Jones, Strassner, and Wang (2016) to estimate proof-of-concept extended SUTs for the United States for 2011. The tables for 2005 and 2012 presented in this paper will be used by the Asia-Pacific Economic Cooperation (APEC) TiVA initiative in the development of regional extended SUTs for these two years. Similar to Fetzer, Howells, Jones, Strassner, and Wang (2016), this paper will build on SUTs for the United States published by BEA (Young, Howells, Strassner, and Wasshausen 2015). Unlike the previous work, this paper will use an unpublished decomposition of the use table into basic value, import, commodity tax, and margin matrices in place of the estimated matrices derived for the previous paper using a quadratic programming approach. This paper will also estimate proof-of-concept extended SUTs disaggregated by firm type based on the methodology of Fetzer and Strassner (2015) using BEA statistics on the Activities of Multinational Enterprises (AMNE) and Internal Revenue Service Statistics of Income data. Once the extended SUTs are constructed, we will derive symmetric industry-by-industry extended input-output tables from the extended SUTs.

While TiVA estimates are most rigorously calculated using international input-output tables that account for the production of all countries in the world, they have been calculated from single country input-output tables in research such as Ma, Wang, and Zhu (2015) and

[1] The views expressed in this paper are those of the authors and should not be attributed to the Bureau of Economic Analysis, U.S. Department of Commerce, or the United States government.

Tang, Wang, and Wang (2014). Following their approach, we will use the Leontief inverse of the U.S. input-output table to calculate TiVA statistics.

Our TiVA statistics for the United States will include measures based on traditional supply-use presentations as well as statistics that reflect firm-level heterogeneity for the years 2005 and 2012. The comparative analysis of the two sets of statistics allows us to understand better how firms within industries engage in global value chains and if the incorporation of firm heterogeneity provides a more accurate measurement of TiVA.

These tables foreshadow more precise estimates of extended SUTs that will be the product of an ongoing long-term U.S. Bureau of Economic Analysis - U.S. Census Bureau microdata link project. As preliminary output from this project, we will construct extended SUTs for the semiconductor industry using establishment-level Census of Manufactures data. We will identify firm characteristics of ownership from the AMNE data from BEA, firm size class from enterprise-level aggregations of the Longitudinal Business Database, and export and import orientation from the Economic Census, the Annual Survey of Manufacturers, and the Longitudinal Firm Trade Transactions Database. While it is unlikely that we will be able to report the actual extended SUTs for the semiconductor industry due to disclosure restrictions, we plan on reporting econometric estimates of the relationship between the firm characteristics and the components of the extended SUTs.

Similar to Fetzer, Howells, Jones, Strassner, and Wang (2016), we expect to find that the domestic value added as a share of the value of exports is similar within large industry groups and that there is much more variation in the value added share of exports when firm type is accounted for. While all of the criteria should account for firm heterogeneity to some degree, we expect to find that ownership characteristics will account for more of the heterogeneity than the measures of size/class and exporter/importer intensity.

References:

Fetzer, J.J. and Strassner, E.H. (2015). Identifying Heterogeneity in the Production Components of Globally Engaged Business Enterprises in the United States, BEA Working Paper WP2015-13.

Fetzer, J.J., Howells, T.F., Jones, L.Z., Strassner, E.H., and Wang, Z. (2016). Estimating Extended Supply-Use Tables in Basic Prices with Firm Heterogeneity for the United States: A Proof of Concept, https://www.gtap.agecon.purdue.edu/resources/download/7863.pdf.

Ma, H., Wang, Z., and Zhu, K. (2015). Domestic content in China's exports and its distribution by firm ownership. *Journal of Comparative Economics*, 43(1), 3-18.

Tang, H., Wang, F., and Wang Z. (2014). The Domestic Segment of Global Supply Chains in China Under State Capitalism. *World Bank Policy Research Paper* 6960.

Young, J. A., Howells III, T. F., Strassner, E.H., and Wasshausen, D.B. (2015). BEA Briefing: Supply-Use Tables for the United States. *Survey of Current Business,* 95(9), 1-8.