

Highlights and Challenges of Measuring Global Production



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Measuring Global Production

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- Highlights of measuring global production
 - Firm-level heterogeneity
 - Extended supply-use tables and trade in value added
 - Microdata link project
- Challenges in measuring global production
 - Need for big (linked) data sets
 - Prices and volumes
 - Factoryless goods producers
 - Multinational enterprises
- Conclusion and way forward

BEA approach

Table 2: 'Ideal' breakdown of columns and rows in SU tables

Foreign Owned						Domestically owned MNE						Domestic Owned																				
With high Export orientation			With low Export orientation			With high Export orientation			With low Export orientation			With high Export orientation			With low Export orientation																	
'Exporters'			'Non-Exporters'			'Exporters'			'Non-Exporters'			'Exporters'			'Non-Exporters'																	
Low import orientation	High import orientation		Low import orientation	High import orientation		Low import orientation	High import orientation		Low import orientation	High import orientation		Low import orientation	High import orientation		Low import orientation	High import orientation																
S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L

Source: OECD Expert Group on Extended Supply-Use Tables: Terms of Reference

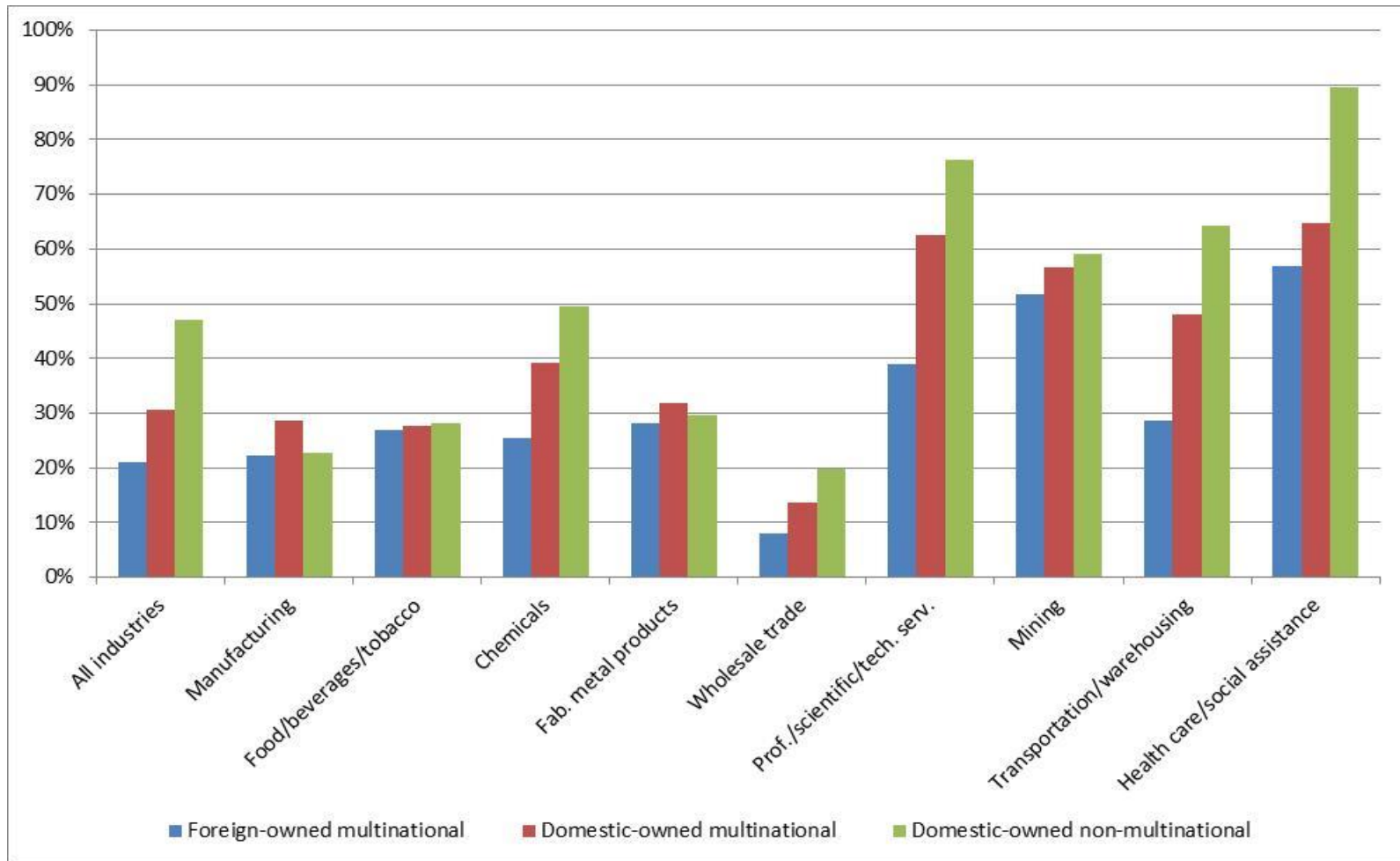
- Tabulations from tax returns for all U.S. firms
- BEA data on activities of multinational enterprises (AMNEs)
- Data from Supply-Use tables (SUTs)
 - Decompose production components gross output
 - Domestic and imported intermediates
 - Components of value added
 - Globally-engaged MNEs and entirely domestic firms
 - Working paper:
http://bea.gov/papers/working_papers.htm
 - Research spotlight:
<http://www.bea.gov/scb/toc/0516cont.htm>

Highlights—extended SUTs and trade in value Added



- Merge firm heterogeneity project with U.S. SUTs
- Incorporate modeling on basic price valuation
- Produce extended SUTs with heterogeneity for 33 OECD industries and 35 products; develop associated TiVA indicators
 - Fetzer, Howells III, Jones, Strassner, Wang “Estimating Extended Supply-Use Tables in Basic Prices with Firm Heterogeneity for the United States: A Proof of Concept”:
http://scholar.harvard.edu/files/jorgenson/files/4a.1_paper.pdf
 - Next paper: “Accounting for Firm Heterogeneity in US Industries: Extend Supply-Use Tables and Trade in Value Added using Enterprise and Establishment Level Data (March 2018, NBER CRIW “Globalization” conference).

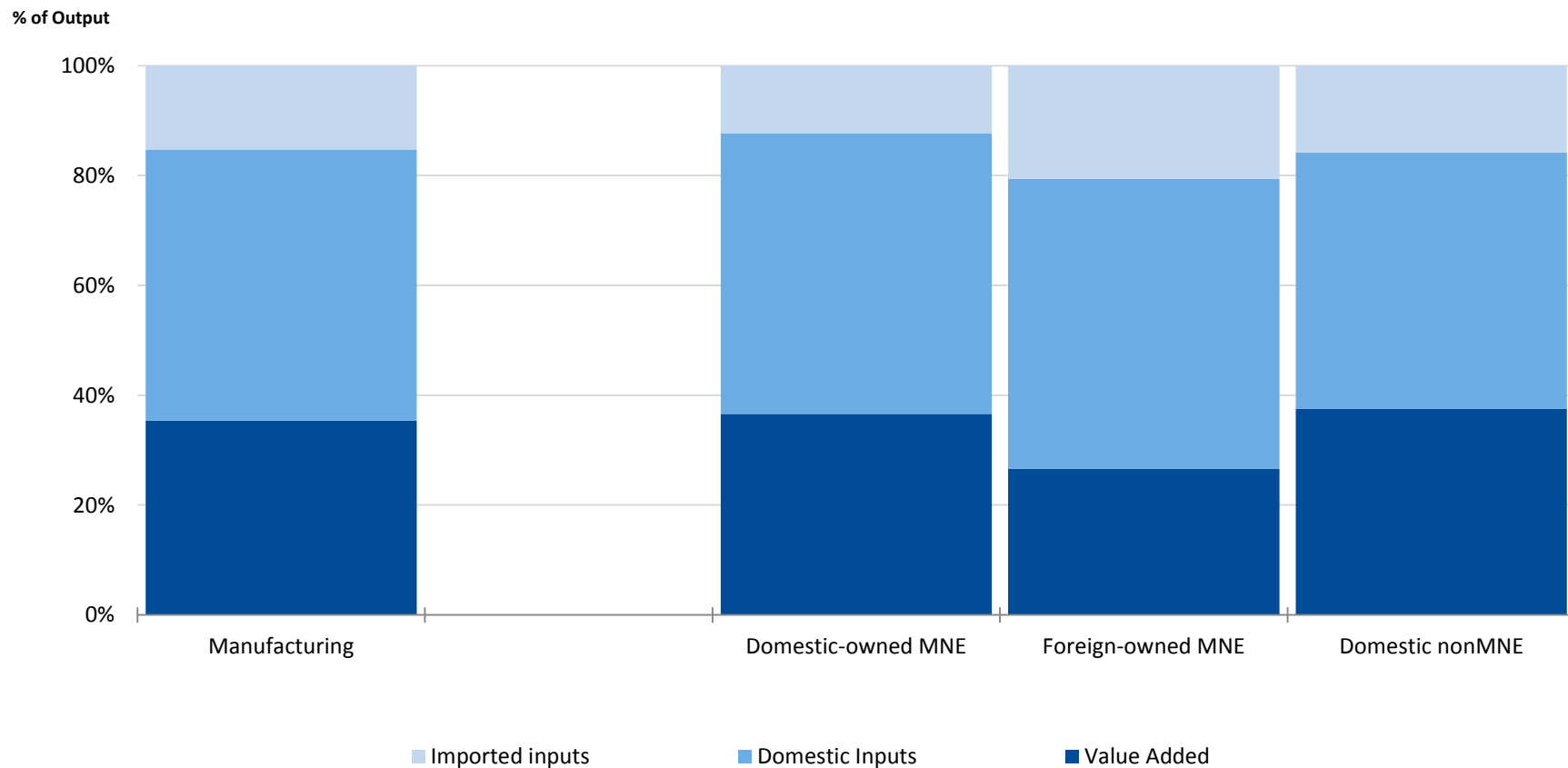
Firm-level heterogeneity: value added as a share of output, selected industries 2011



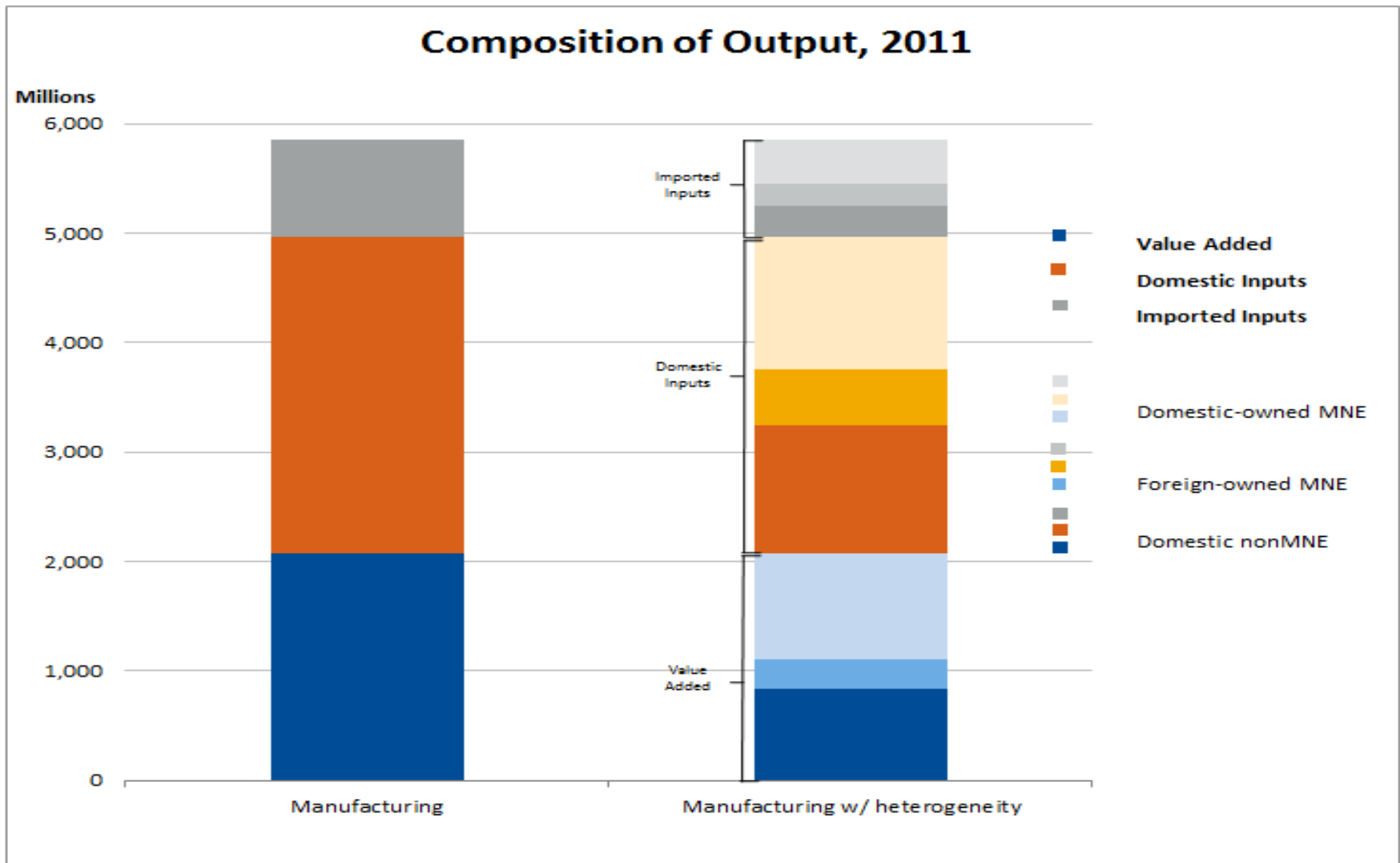
Source: James J. Fetzer and Erich H. Strassner, "Identifying Heterogeneity in the Production Components of Globally Engaged Business Enterprises in the United States," BEA working paper (WP2015-12).

Manufacturing with and without heterogeneity

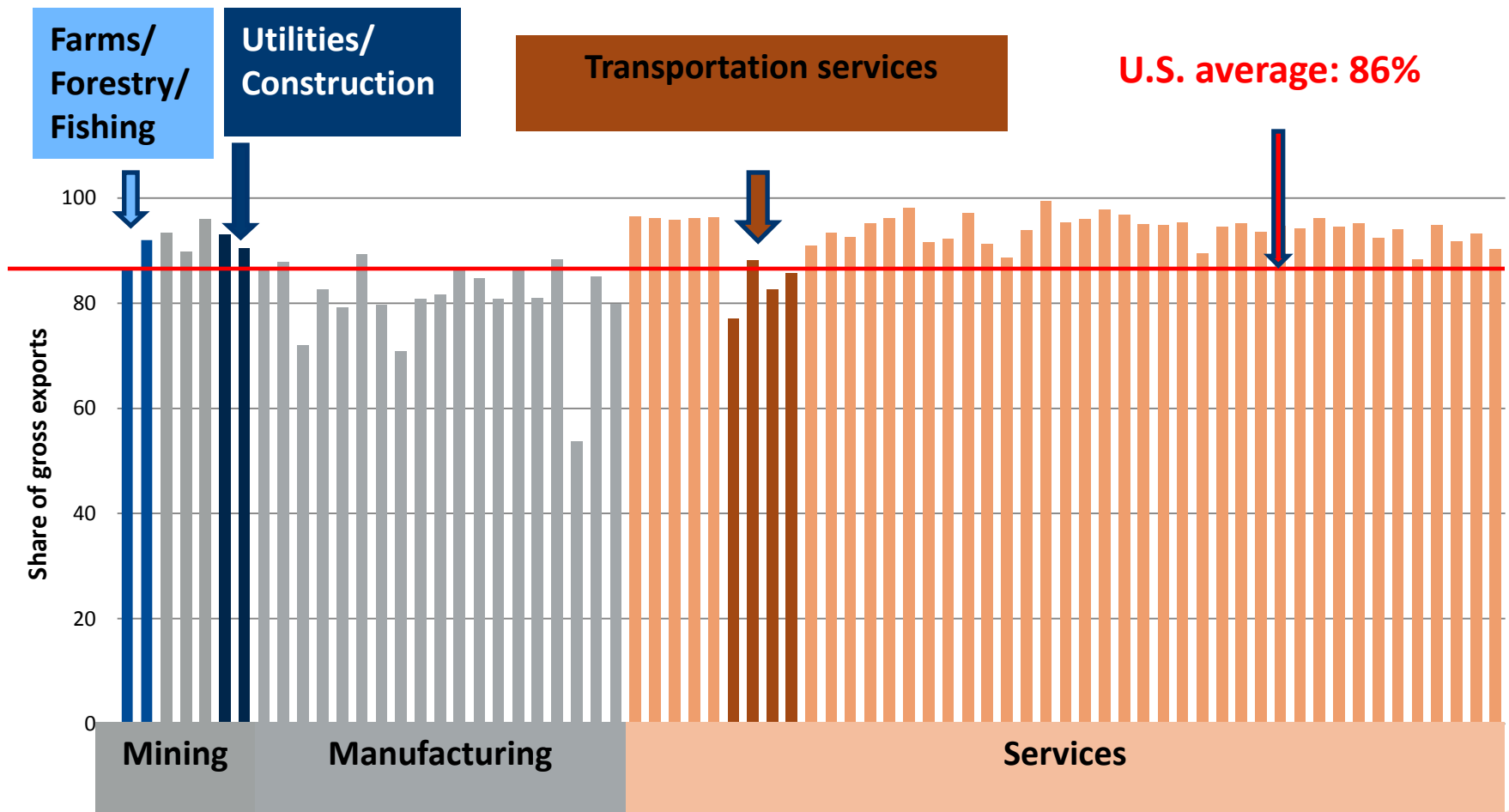
Composition of Output, 2011



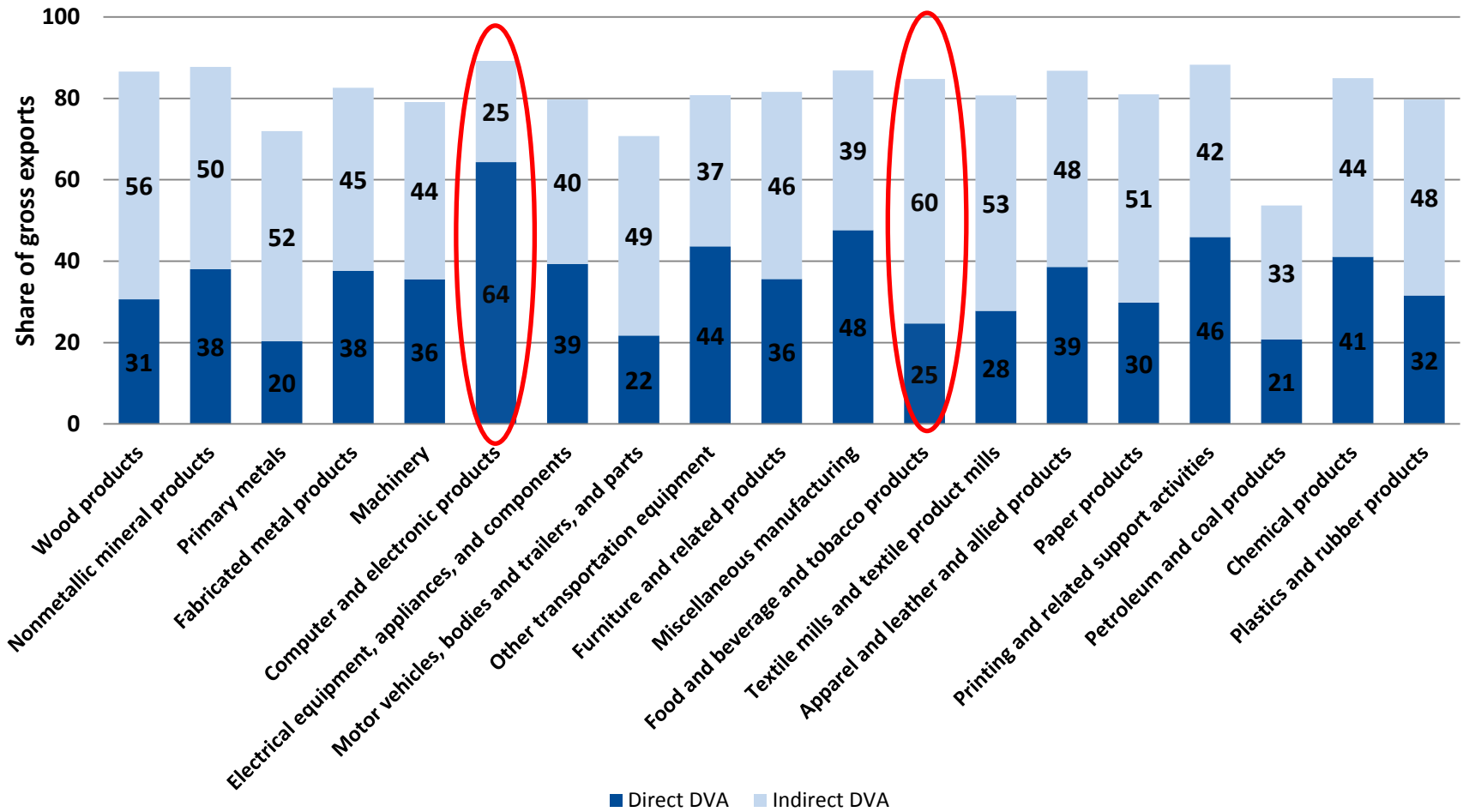
Manufacturing with and without heterogeneity



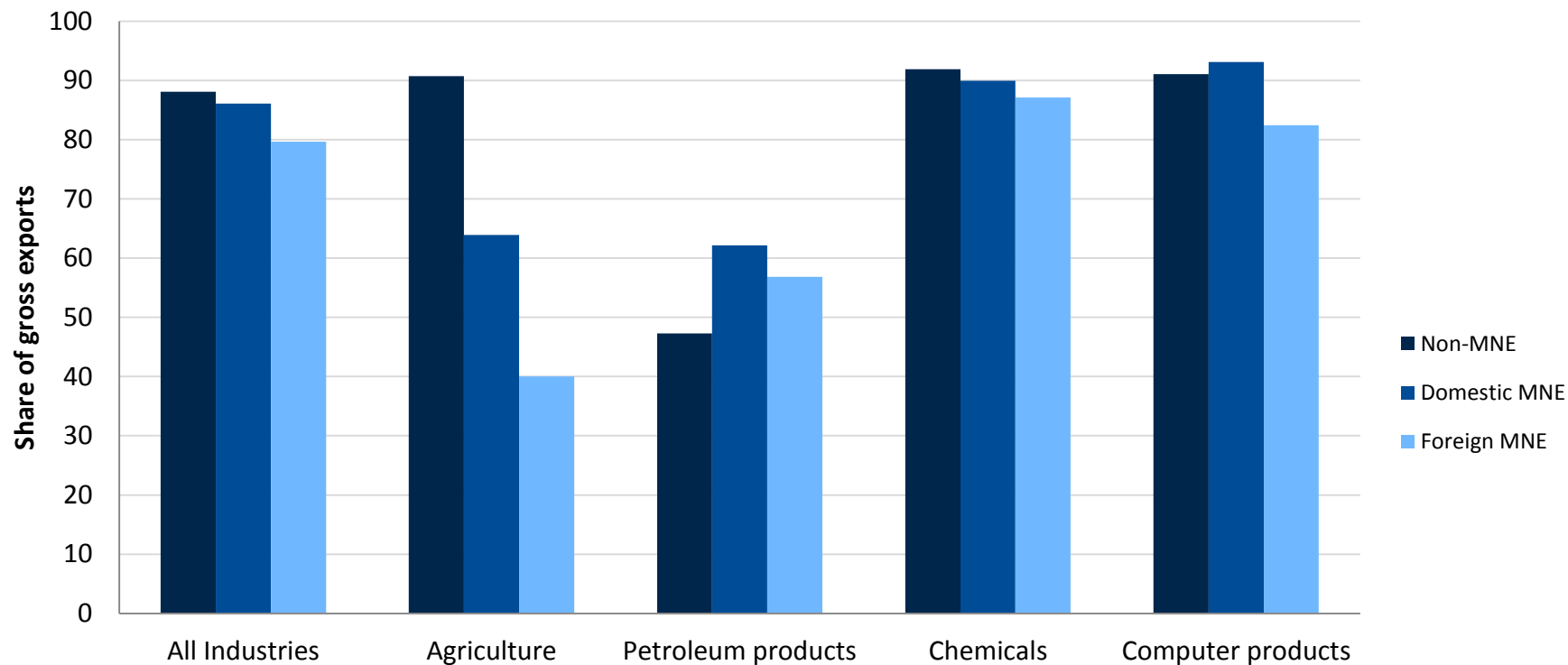
Domestic value added share of U.S. gross exports by sector, 2011



Direct and indirect domestic value added share of U.S. gross exports for manufacturing, 2011



Domestic value added share of gross exports with firm heterogeneity, 2011



Fetzer, Howells III, Jones, Strassner, Wang (2016) "Estimating Extended Supply-Use Tables in Basic Prices with Firm Heterogeneity for the United States: A Proof of Concept"

- Data:
 - Census Bureau
 - Economic censuses and annual surveys
 - Trade in goods
 - BEA
 - AMNEs
 - Trade in services
- Five-year project started in April 2016
 - Links completed for 2007 and 2012, for both inward and outward investment
 - Semiconductor case study: major production variables complete by firm type and ownership
 - Import use by 4-digit NAICS by 10 digit harmonized code

Challenges in measuring global production—big data and institutional arrangements



- Requires “big data” sets to work off from
 - Enterprise statistics, size class data, establishment data, and trade data (among others) collected from...
 - Enterprise and MNE surveys, economic censuses and surveys, services trade surveys, administrative data, tax data, and customs records
 - Not all of this information is readily available so creativity is crucial
- May require establishing institutional arrangement within the economy
 - In United States, BEA and Census Bureau are involved with project
 - Microdata link project will run five years with goal of identifying heterogeneity tabulations
 - To do this on an ongoing basis, statistical systems may need to better integrate enterprise and establishment data

Challenges in measuring global production— prices and volumes



- Globalization complicates input price measurement
 - Input prices required to construct real value added and multifactor productivity
 - Challenges in measuring trade prices, e.g. (Feenstra and Romalis, 2013)
 - Pricing to market implies output prices may not be a good proxy for intermediate input prices (Samuels and Soloveichik 2016)
 - Intangibles: priced mostly based on local input costs, but used globally, often with price discrimination across countries

Challenges in measuring global production— factoryless goods producers

- Unresolved: Industrial classification
 - Can FGPs be identified at the establishment level?
 - Ongoing work in the U.S. suggests no
 - What industries have been considered?
 - Distribution, manufacturing, head office, R&D services
- Unresolved: Treatment of transactions
 - Summary in UN *Guide to Measuring Global Production*
 - *BPM6* seems to suggest merchandising (paragraph 10.42)
 - Contract manufacturer ownership of material inputs is not consistent with manufacturing services on physical inputs owned by others
 - General merchandise results in output recorded in two countries
- More clarification and decisions are needed

Challenges in measuring global production— multinational enterprises

- **Transfer pricing**

- Lack of market equivalents generates gaps between transfer price and arm's length price for some products
 - Intangibles unique to a firm
 - Headquarter services
 - Firm-specific financing arrangements
- Mismeasurement limited because transfer prices are subject to strict regulatory scrutiny and enforcement by tax authorities

- **Structuring for purposes other than production**

- Arises when MNEs take advantage of heterogeneous tax laws and other regulations across countries
- Facilitates artificial location of production and related income as well as strategic location of financial assets and liabilities → mismeasurement
- Generates a wedge between the locations of production, underlying factors of production, and means for financing production → mismeasurement

- Proof-of-concept analysis validates firm-level heterogeneity across industries
 - Although available data has limitations
 - Next step to develop extended tables for 2005 and 2012
- Development of complimentary globalization statistics worth pursuing despite the need for patience and creativity
 - Microdata link
 - Complete case study and further tabulations between 2007 and 2012
 - Develop specification for an ongoing heterogeneity tabulation
- Expand research agenda for global production...much to do!
- Time to rethink data collections?
 - Well established collection mechanisms need to change for the times, but how to get past institutional inertia?