

## Measurement and Patterns of World Agribusiness Trade

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*This brief highlights the importance of the agribusiness sector as a pillar for development. It provides a framework to measure internationally traded agribusiness and discusses some patterns of world agribusiness trade in recent decades. The share of traded agribusiness goods in world trade has remained fairly constant, while the value of world agribusiness trade has increased significantly. To account for the diversity within the agribusiness sector, it distinguishes between primary and manufacturing traded agribusiness. To proxy the degree of sophistication of the agribusiness trade, it considers the ratio of manufacturing to primary traded agribusiness goods. Whereas the share of primary agribusiness imports in total imports is small, manufacturing agribusiness imports play a more significant role, especially in low-income countries. Primary agribusiness exports are still a major component of total exports of goods in low-income economies.*

### Linking Agriculture and Agribusiness

In recent years, the interest in agriculture has reignited, mainly driven by a new understanding that growth of the agricultural sector can play a major role in overall growth and poverty reduction—both directly and through its linkages with the manufacturing and services sectors (Barrett, Carter and Timmer 2010). While the size of economic growth is important for alleviating poverty, its sectoral composition significantly affects the extent of poverty reduction. Evidence shows that growth in sectors intensive in unskilled labor, such as agriculture and manufacturing, particularly contributes to reducing poverty (Loayza and Raddatz 2010). Growth in these sectors can be fostered through a dynamic agribusiness sector that efficiently links farmers and consumers (World Bank 2007).

Historically, trade in processed agricultural and food products has been concentrated in a relatively small number of high-income economies, while developing countries have exported mainly homogenous, unprocessed agricultural products (World Bank 2007). This analysis shows the increasing importance of agribusiness trade flows across countries in all income groups—particularly in low-income economies. While the role of agriculture in the structural transformation and progress of economies has been extensively studied, this brief underlines the significance of agribusiness trade as a pillar for development.

This brief contributes to the recent debate on the importance of agribusiness trade in three ways. First, using the national accounting structure, it establishes a framework to depict the agribusiness sector and its intersection with trade. Second, it measures international agribusiness trade flows from 1990 to 2014, using a set of 184 countries at all income levels. Third, it presents stylized facts of agribusiness trade patterns over time, across income aggregations and by product categories. To illustrate the framework, the agribusiness trade flows of two upper-middle-income countries, Malaysia and Mexico, are compared (box 1).

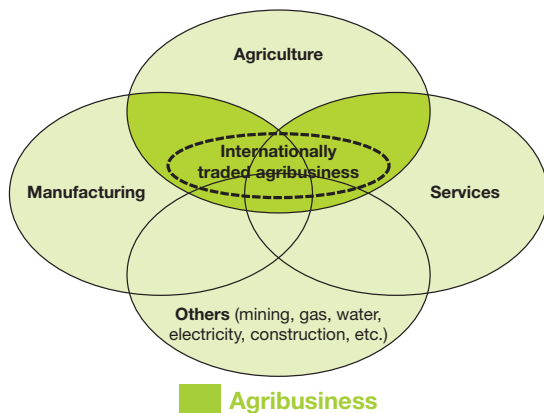
### Agribusiness and Traded Agribusiness: Some Definitions

In general terms, agribusiness can be understood as the collective business activities performed “from farm to fork” (Konig, Da Silva and Mhlanga 2013). However, agribusiness is an evolving term that has been expanded and complemented with a variety of names, such as agro-industrialization (Cook and Chaddad 2000) and agriculturals (Goldberg 1999). These definitions share an emphasis on the interdependence of the various sectors of the agri-food supply chain (Ng and Siebert 2009). The pioneers of the agribusiness concept, John H. Davis and Ray A. Goldberg, define agribusiness as “the total sum of all operations involved in the manufacture and distribution of farm supplies; production operations on the farms; and the storage, processing, and distribution of farm commodities and items made from them” (Davis and Goldberg 1957). Agribusiness can therefore be defined as a set of economic activities in which the agricultural sector overlaps with the manufacturing, services, and other economic sectors (see shaded green area in figure 1).

Traded agribusiness products rely on services, such as transport services, financial services, and communication services, and involve at least basic manufacturing or processing steps, such as simple treatment and/or packaging of the good, supported by other sectors such as water and electricity. Because every good or product requires different inputs and follows a different production process, it involves the different sectors to different extents. Therefore, traded agribusiness is a subset of the green area defined as agribusiness in figure 1. It lies close to the intersection of all sectors, but cannot be exactly determined, given its links with other activities of the economy. Given constraints in data structure, this analysis studies only a share of traded agribusiness. It considers the agribusiness goods included in the United Nations (UN) Comtrade database. Therefore, the estimates of agribusiness trade flows should be considered as a lower bound.

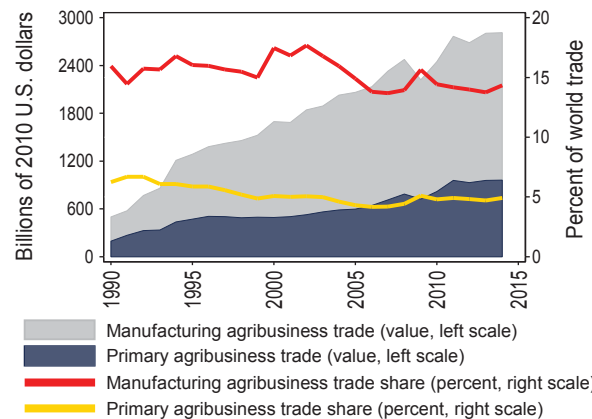
To account for the heterogeneity of the agribusiness sector, this

Figure 1. The Links Between Agribusiness and Internationally Traded Agribusiness



Source: World Bank staff.

Figure 2. The Value of Agribusiness Trade Has Steadily Risen, While Its Share in Total World Trade Has Been Fairly Constant Since 1990



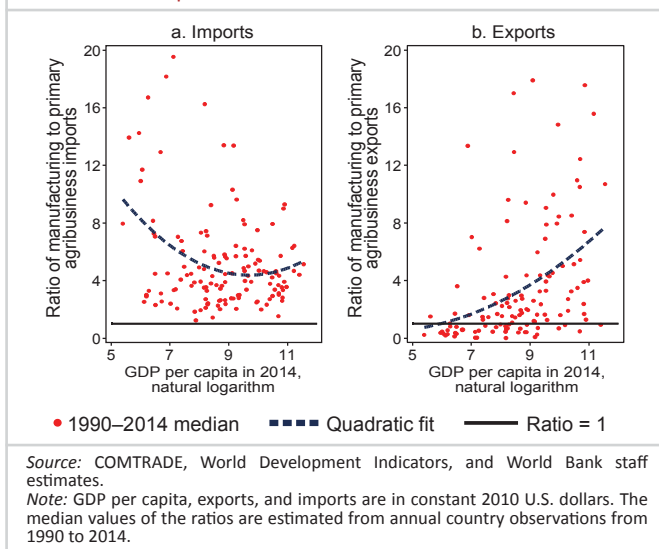
Source: COMTRADE, World Development Indicators, and World Bank staff estimates. Note: Trade is defined as the sum of exports and imports. Observations are annual from 1990 to 2014.

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**Figure 3. As Income Increases, Countries Decrease the Ratio of Manufacturing to Primary Agribusiness Imports, but Increase the Ratio for Exports**



analysis distinguishes between primary and manufacturing agribusiness products. This categorization highlights the relevance as well as the differences in trade flows. Agribusiness products are classified using the Standard Industrial Classification (SIC) system. Primary agribusiness includes three subcategories: 1) agriculture; 2) livestock; and 3) forestry. Manufacturing agribusiness encompasses ten, more heterogeneous, subcategories: 1) canned; 2) cereals; 3) drinks; 4) leather; 5) meat; 6) oils; 7) paper; 8) tobacco; 9) wood; and 10) other.

### Agribusiness Trade Around the World

Primary and manufacturing agribusiness trade has expanded substantially around the world in the past few decades. Using a set of 184 countries (62 high-income countries, 96 middle-income countries, and 26 low-income countries), the estimates in this analysis proxy lower bounds for global primary and manufacturing agribusiness trade volumes. From 1990 to 2014, primary agribusiness trade grew from \$195 billion to \$963 billion of constant 2010 U.S. dollars, while manufacturing agribusiness trade soared from \$498 billion to \$2,812 billion (figure 2). Primary agribusiness trade therefore rose at an annual average rate of 6.9 percent, while manufacturing agribusiness trade increased annually by 7.5 percent.

While growth rates for primary and manufacturing agribusiness have been high, the primary and manufacturing agribusiness shares in total trade have been mostly stable over the 1990–2014 period. The shares in total trade shrank by only one percentage point, from 6 to 5 percent, in the case of primary agribusiness, and by two percentage points, from 16 to 14 percent, in the case of manufacturing agribusiness. Consistent with the stages of structural transformation (see Clark 1951, Lewis 1954, Timmer 2009), the small decrease in trade shares of agribusiness goods might be associated with the long-term decline of value added in agriculture.

### The Growing Sophistication of Agribusiness Trade as Income Levels Rise

Over the last 100 years more robust methods and tools to foster more efficient operations within the agribusiness sector have been developed (King, et al. 2010). The expansion and modernization of agribusiness operations typically stimulate productivity, process and product innovation, and ancillary services for domestic and export activities that foster competitiveness and stronger backward and forward linkages within the agro-food system (World Bank 2003). This analysis considers the ratio of manufacturing to primary agribusiness trade as proxy for the sophistication of the agribusiness trade. More sophisticated economies tend to export more manufacturing agribusiness than primary agribusiness goods. In contrast, less sophisticated economies tend to import more manufacturing than primary agribusiness goods, given their economic and capacity constraints. Figure 3 illustrates this pattern: as their income increases, countries tend to decrease imports of manufacturing agribusiness goods and increase their exports of manufacturing agribusiness goods, relative to primary agribusiness imports and exports, respectively.

The shares of manufacturing and primary agribusiness in total exports and imports across country income groups show some patterns (figure 4). Overall, from 1990 to 2014, the share of manufacturing agribusiness in exports and imports has been greater than the share of primary agribusiness goods. This is consistent across export and import shares in high-income and middle-income countries, and imports shares in low-income countries. Primary agribusiness exports have played an important role in the low-income economies, greatly exceeding their export shares of manufacturing agribusiness. Figure 4 also displays that as countries increase their income, the trade balance of both manufacturing and primary agribusiness narrows.

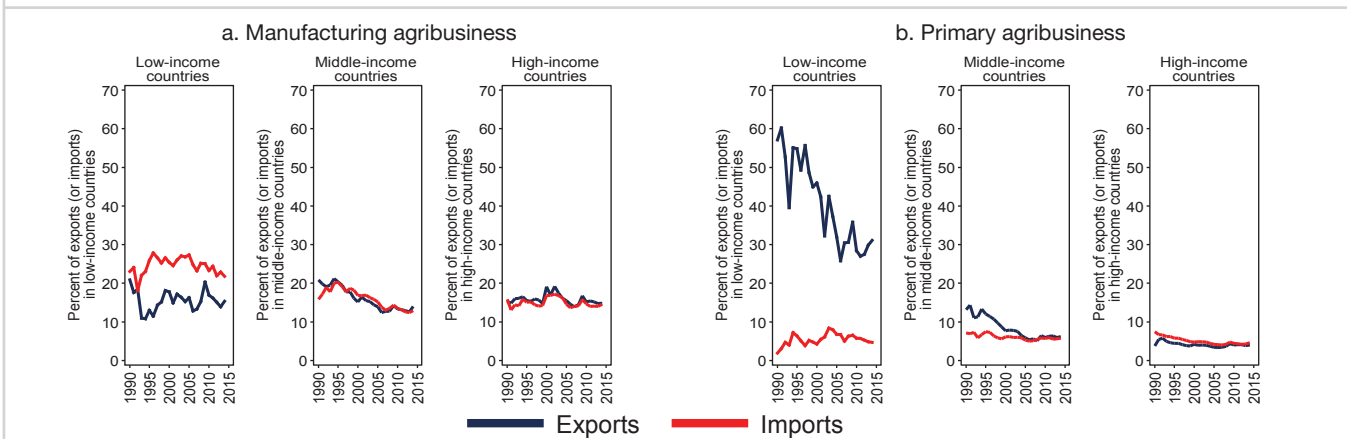
Despite the recent decreasing trend, manufacturing agribusiness shares in total imports have consistently been smaller in high-income and middle-income countries than in low-income countries (figure 4, panel a). These manufacturing agribusiness import shares in middle-income countries have been slightly lower than in high-income countries since the mid-2000s. The share of manufacturing agribusiness exports in total exports has been more uniform among income groups, averaging 15.8 percent for high-income countries, 16 percent for middle-income countries, and 15.5 percent for low-income countries from 1990 to 2014.

With respect to primary agribusiness, export shares have been lower in high-income countries than in the other two income country groups (figure 4, panel b). Low-income countries are characterized by the fact that even though their primary agribusiness share in total exports shows a decreasing trend over time, their average export shares remain large: 57 percent in 1990 and 31 percent in 2014. Shares of primary agribusiness imports were mostly consistent across the three income groups, ranging from 5 to 6 percent from 1990 to 2014.

Primary and manufacturing agribusiness goods might be partial substitutes in low-income countries. Developing countries have the incentive to export and import more for a variety of reasons, such as to grow faster (Dollar and Kraay 2003). In addition, low-income countries have the economic motivation to import agricultural products, given low productivity levels in local production sectors (Lagakos and Waugh 2013, Gollin, Lagakos and Waugh 2014). Furthermore, many low-income economies struggle with food security concerns; basic and cheap agricultural imports can augment supplies and reduce food vulnerabilities.

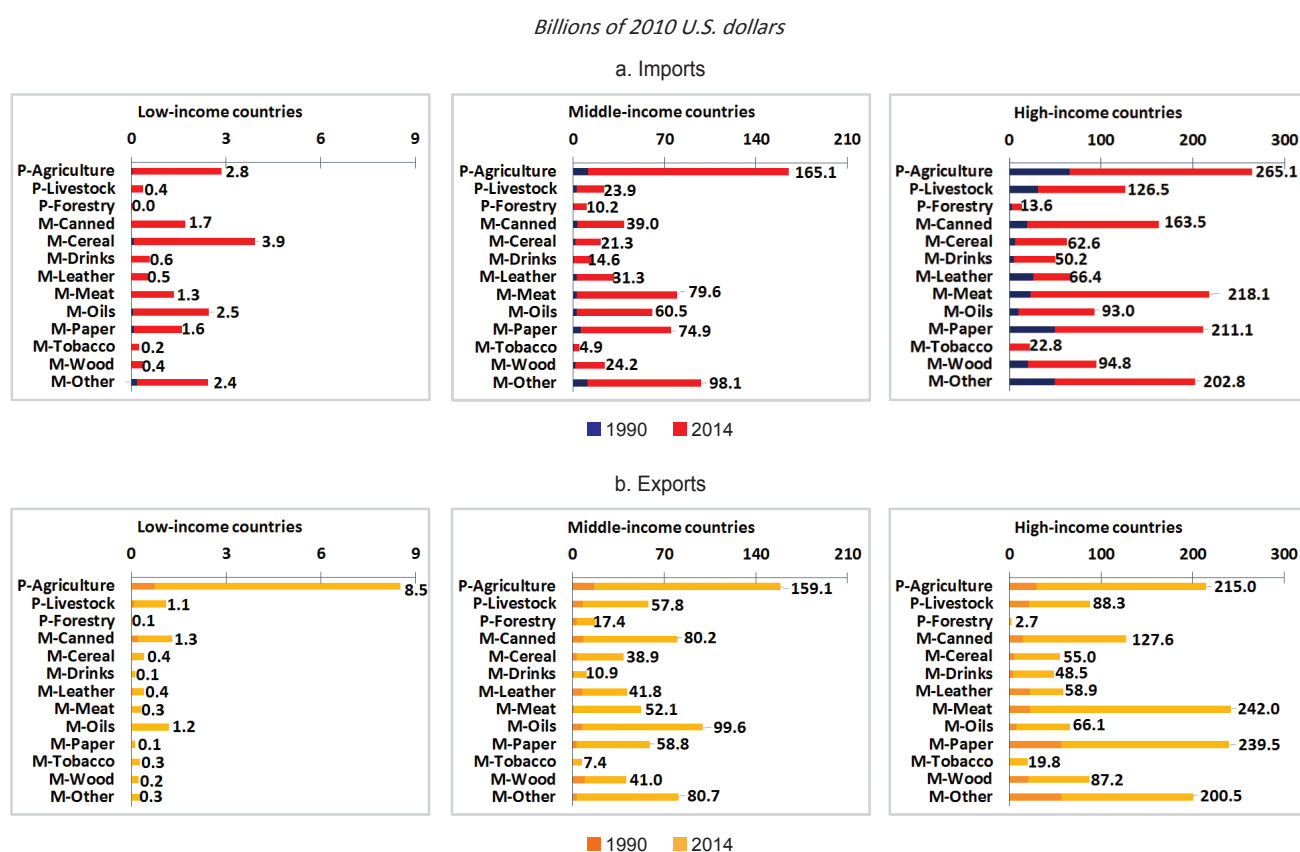
Despite the strong reasons to import, evidence suggests that developing countries are not making full use of the trade channel;

**Figure 4. The Share of Manufacturing Agribusiness in Total Exports and Imports Has Fluctuated Across Income Groups, with Exports of Primary Agribusiness Declining the Most in Low-Income Countries**



Source: COMTRADE, World Development Indicators, and World Bank staff estimates.  
 Note: Income aggregations are based on the September 2016 definitions of the World Development Indicators. Observations are annual from 1990 to 2014.

Figure 5. Trade of Manufacturing Agribusiness Has Expanded Faster Than Primary Agribusiness, Especially in Low-Income Countries in Recent Decades



Source: COMTRADE, World Development Indicators, and World Bank staff estimates.

Note: P = primary agribusiness. M = manufacturing agribusiness. Stacked aggregated import and export values for 1990 and 2014. Income aggregations are based on the September 2016 definitions of the World Development Indicators. The corresponding SIC codes for the subcategories of primary and manufacturing agribusiness are available upon request. The subcategory "other" includes pesticides, farm machinery and equipment, food products machinery, gum and wood chemicals, botanicals, fertilizers, paper and woodworking machinery.

instead, they are constrained in importing primary agricultural products because of supply restrictions and high trade costs (Tombe 2015). Across income groups and even in low-income countries, this analysis shows that shares of primary agribusiness imports have been low in recent decades (figure 4, panel b). In addition, low-income countries have the highest shares of manufacturing agribusiness imports across income groups. Some substitution effect of goods might be a partial explanation of the high import shares of manufacturing agribusiness and the low import shares of primary agribusiness in low-income countries (figure 4, panels a and b). The share of manufacturing agribusiness imports accounts for almost 25 percent of their total imports in low-income countries on average in the 1990–2014 period. Despite existing trade constraints, the high shares of both primary agribusiness exports and manufacturing agribusiness imports in low-income countries indicate some level of integration with regional or global trade frameworks.

### The Changing Composition of International Agribusiness Trade

The increasing importance of the agribusiness trade sector for growth and poverty reduction is associated with the evolution and expansion of agricultural goods and farm related activities. The structural transformation of the agricultural sector is characterized by improvements in productivity, the change in composition of produced goods from low value and low risk to high value and high risk, and the increased integration of the agricultural sector into regional and global markets (Divanbeigi, Paustian and Loayza 2016). This development generates demand for agribusiness products in nonagricultural sectors, particularly for fertilizers, transportation, commercial services, and machinery (Timmer 1988).

Despite the structural transformation, agricultural outputs—and their trade—continue to rise in absolute value (Timmer 2009). To illustrate the rising of agribusiness trade, figure 5 presents values of subcategories of primary and manufacturing agribusiness for imports and exports across income groups for 1990 and 2014. Across all income classifications, the

growth rates of imports and exports of all subcategories have been positive. These growth rates across varieties of agribusiness subcategories indicate a consistent expansion of the sector, in keeping with the aggregate global trend, and demonstrate that all the subcategories are part of the impressive agribusiness trade expansion.

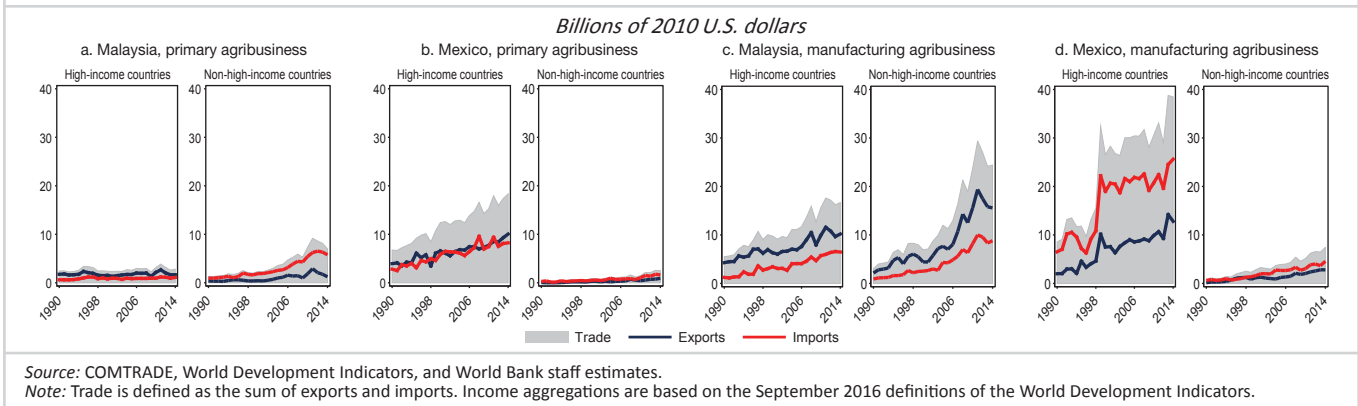
The expansion of primary and manufacturing agribusiness has been uneven across subcategories and income groups. For instance, on average and across income groups, growth rates in primary and manufacturing agribusiness imports and exports are higher in low-income countries than in high-income countries or middle-income countries, and lowest in high-income countries. Nine subcategories of agribusiness imports (livestock, agriculture, wood, tobacco, oils, meat, drinks, cereals and canned products) and five subcategories of agribusiness exports (tobacco, oils, meat, cereals, and others) have increased at annual average growth rates of more than 15 percentage points in low-income countries.

### Conclusion

This brief presents a framework to categorize primary and manufacturing agribusiness goods and to quantify their respective international trade flows. The empirical results show that the world trade values for primary and manufacturing agribusiness increased significantly from 1990 to 2014, while their share in total world trade has remained mostly stable. As income rises, the ratio of manufacturing to primary agribusiness imports decreases, while for exports, the ratio increases.

Trade structures vary significantly across country income groups. For instance, the trade balance of both manufacturing and primary agribusiness narrows as countries increase their incomes. In addition, export shares of primary agribusiness are much lower in high-income countries than in low- and middle-income economies. Finally, on average, observed growth rates of subcategories of primary and manufacturing traded agribusiness are higher in low-income countries than in other income groups.

Figure B1.1. Trade of Agribusiness with High and Non-High-Income Countries Has Increased Sharply in Malaysia and Mexico, Largely Driven by Manufacturing Agribusiness Since 1990



**Box 1. Diverging Agribusiness Trade Structures in Malaysia and Mexico from 1990 to 2014**

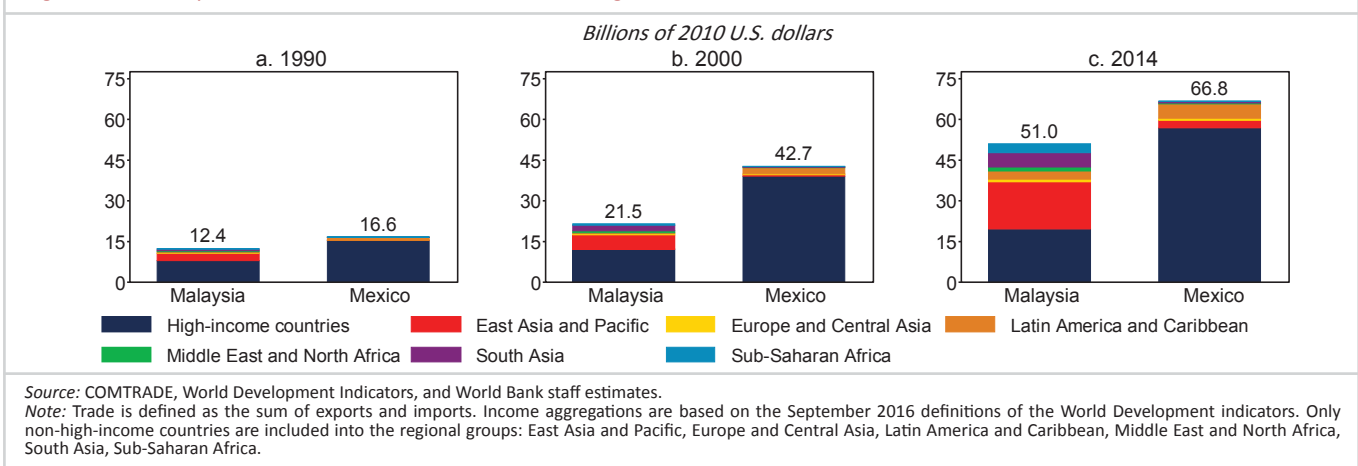
Following the framework presented in this brief, agribusiness trade flows in Malaysia and Mexico have increased substantially from 1990 to 2014, consistent with global trends. Malaysia expanded its global primary and manufacturing agribusiness trade from \$12.4 billion in 1990 to \$51 billion in 2014 (figure B1.1, panel a and c). While primary agribusiness exports increased slightly from \$2.2 to \$2.9 billion, manufacturing agribusiness exports nearly quadrupled from \$6.5 to \$25.8 billion. Similarly, while primary agribusiness imports grew from \$1.6 to \$6.9, manufacturing agribusiness imports increased more than seven-fold from \$2.1 to \$15.3 billion.

In the same period, Mexico more than quadrupled its global agribusiness trade from \$16.6 billion to \$66.8 billion (figure B1.1, panel b and d). Mexico nearly tripled its primary agribusiness exports from \$4.0 billion to \$11 billion and increased its manufacturing agribusiness

exports more than seven-fold, from \$2.2 billion to \$15.7 billion. Mexican primary agribusiness imports tripled from \$3.2 billion to \$9.9 billion, while manufacturing agribusiness imports more than quadrupled from \$7.2 billion to \$30.2 billion.

While both countries have increased their imports and exports globally and across regions, their trade structures have diverged in some aspects. Whereas Mexico has run a deficit in the agribusiness trade, Malaysia has enjoyed a surplus. In 2014, Malaysia had a much higher amount of manufacturing agribusiness exports (\$25.8 billion) than Mexico (\$15.7 billion). These levels are especially impressive considering that in 2014 Malaysia's GDP (\$314 billion) and population (30 million) were much smaller than Mexico's GDP (\$1,178 billion) and population (125 million). Finally, both countries have pursued different paths in diversifying their trade partners (figure B1.2). While Mexico's main primary and manufacturing agribusiness trade partners have been high-income countries (especially in North America), Malaysia has expanded with a more balanced and diversified trade partner structure across regions and income groups.

Figure B1.2. Malaysia and Mexico Have Followed Different Agribusiness Trade Diversification Paths



**References**

Barrett, C. B., M. R. Carter, and C. P. Timmer. 2010. "A Century-Long Perspective on Agricultural Development," *American Journal of Agricultural Economics*, 92, 447-468.

Clark, C. 1951. *The Conditions of Economic Progress*. London: McMillan.

Cook, M. L., and F. R. Chaddad. 2000. "Agroindustrialization of the Global Agrifood Economy: Bridging Development Economics and Agribusiness Research," *Agricultural Economics*, 23, 207-218.

Davis, J. H., and R. A. Goldberg. 1957. "A Concept of Agribusiness," *Division of Research. Graduate School of Business Administration. Boston: Harvard University*.

Divanbeigi, R., N. Paustian, and N. Loayza. 2016. "Structural Transformation of the Agricultural Sector: A Primer" *World Bank Research Policy Brief*.

Dollar, D., and A. Kraay. 2003. "Institutions, Trade, and Growth," *Journal of Monetary Economics*, 50, 133-162.

Goldberg, R. 1999. "The Business of Agriceuticals," *Nature Biotechnology*, 17, BV5-BV6.

Gollin, D., D. Lagakos, and M. E. Waugh. 2014. "Agricultural Productivity Differences across Countries," *The American Economic Review*, 104, 165-170.

King, R. P., M. Boehlje, M. L. Cook, and S. T. Sonka. 2010. "Agribusiness Economics and Management," *American Journal of Agricultural Economics*, 92, 554-570.

Konig, G., C. A. Da Silva, and N. Mhlanga. 2013. "Enabling Environments for Agribusiness and Agro-Industries Development: Regional and Country Perspectives," Rome, Italy: Food and Agriculture Organization of the United Nations.

Lagakos, D., and M. E. Waugh. 2013. "Selection, Agriculture, and Cross-Country Productivity Differences," *The American Economic Review*, 103, 948-980.

Lewis, W. A. 1954. "Economic Development with Unlimited Supplies of Labor," *Manchester School of Economic and Social Studies*, 22, 139-191.

Loayza, N. V., and C. Raddatz. 2010. "The Composition of Growth Matters for Poverty Alleviation," *Journal of Development Economics*, 93, 137-151.

Ng, D., and J. W. Siebert. 2009. "Toward Better Defining the Field of Agribusiness Management," *International Food and Agribusiness Management Review*, 12.

Timmer, C. P. 1988. "The Agricultural Transformation," *Handbook of Development Economics*, 1, 275-331.

-----, 2009. *A World without Agriculture: The Structural Transformation in Historical Perspective*. Washington, D.C.: The American Enterprise Institute.

Tombe, T. 2015. "The Missing Food Problem: Trade, Agriculture, and International Productivity Differences," *American Economic Journal: Macroeconomics*, 7, 226-258.

World Bank. 2003. "Promoting Agro-Enterprise and Agro-Food Systems Development in Developing and Transition Countries: Towards an Operational Strategy for the World Bank Group," *World Bank Report*.

-----, 2007. *World Development Report 2008: Agriculture for Development*. Washington, D.C.: World Bank.