Model Results: Global Growth Effects on U.S. Trade

The analysis of global growth influences using the GTAP model illustrates three main points. First, the historical pattern of U.S. agricultural exports is broadly consistent with the simulated effects of global economic growth and population change. Although actual U.S. exports fluctuated considerably, the general pattern of modest growth, but with a shifting direction of exports to emerging markets, is corroborated. Second, consistent with model results, U.S. export growth has begun to accelerate since 2001, although the rapid growth of trade with individual markets, such as Mexico and Canada, cannot be attributed to economic growth factors alone.[20] If global growth continues, exports also can be expected to continue to grow at a faster pace during 2006-16 than during the 1990s due to the shift in U.S. and global exports toward the emerging markets. Lastly, the pace of U.S. imports was far higher than would be explained by U.S. economic growth and population change alone, indicating that other factors are responsible for the recent growth of U.S. imports.

[20]The phaseout of tariffs on trade in NAFTA and the influence of foreign direct investment and arm's length transactions all contributed to the rapid growth in agricultural trade

The backcasting exercise demonstrates that historical changes in trade deriving from actual global growth are consistent with U.S. export growth patterns at the aggregate level. Between 1990 and 2001 (the GTAP model's base year), the projected effect of global growth and population change on U.S. export growth was a 2.6-percent annual growth rate, slightly higher than actual average export growth of 2.2 percent (table 2). Despite the surge (and subsequent decline) of actual U.S. exports in the mid-1990s, the actual pattern of modest growth for the entire period could have been anticipated because the slow-growing high-income markets initially accounted for the majority of U.S. exports (52 percent in 1990).[21] Over the same period, simulated annual export growth to high-income markets was 1.5 percent (1.7 percent actual), compared with projected growth of 4.6 percent to fast-growing emerging markets (5.1 percent actual).

[21]High-income markets include Japan, Western Europe, Canada, and Oceania. Faster growing economies include other East Asian countries, Southeast Asia, South Asia, Mexico, and other Central American countries.

Even though per capita income grew more in absolute terms (but not in percentage terms) in high-income markets than in faster growing emerging economies during the 1990-2001 period, food consumption and import demand in high-income countries slowed because the share of income spent on food was lower in these countries and continued to decline.[22] Diminished population growth in high-income markets also slowed growth in consumption and demand. U.S. exports to emerging economies grew more than twice as fast as exports to high-income countries, but the impact on overall export growth was moderated by the relatively low base from which exports to the rapidly growing markets started: 30 percent of the market for U.S. exports in 1990. The simulated historical trade pattern suggests that the slowing of U.S. agricultural exports was consistent with ongoing global structural shifts.

[22]This is a feature of the model's demand specification that is supported by econometric evidence.

Although the broad pattern of simulated and actual U.S. export growth to the aggregated market groups was similar, the difference between simulated exports and actual export growth rates varied in individual markets. Trade agreements, the strength or weakness of different currencies, and unpredictable market developments for particular commodities affect how U.S. trade flows have evolved in particular markets. The GTAP model in this exer-

Table 2
Actual and predicted U.S. agricultural trade changes from global economic growth

	Annual change, 1990-2001		Annual change, 2001-06		Annual change, 2006-16
	Simulated	Actual	Simulated	Actual	Simulated
	Percent				
Exports					
Fast-growing emerging markets	4.6	5.1	6.9	12.1	6.6
China	7.8	8.9	12.1	27.7	10.1
Mexico	3.3	9.3	5.0	7.3	6.6
Other	4.6	2.8	6.5	3.3	5.6
High-income markets	1.5	1.7	1.5	2.4	0.1
Canada	2.3	7.6	2.5	7.1	1.9
Other high-income	1.1	-1.7	1.1	-0.2	-0.7
Other developing and transition	2.5	-1.6	3.8	5.1	2.2
Total exports	2.6	2.2	4.1	5.3	3.7
Total imports	2.0	5.0	1.8	10.3	1.6

Note: Predicted effects are simulated in the absence of all policy or exchange rate effects.
Source: USDA, ERS using GTAP model version 6.2.

cise did not account for these factors. For example, U.S. export growth to NAFTA partners is underprojected, and exports to "other" high-income countries (excluding Canada) are overprojected. Growth effects generated a 3.3-percent annual increase in U.S. exports to Mexico from 1990-2001, while actual exports to Mexico grew 9.3 percent annually. Similarly, actual U.S. exports to Canada during the same period grew about three times faster than predicted. These differences reflect the relative importance of NAFTA trade liberalization and the regional integration of the North American market during the time period. U.S. exports to China also grew much greater than projected during 2001-06, due partly to the general fostering of trade related to China's accession to the World Trade Organization (WTO) in 2001.

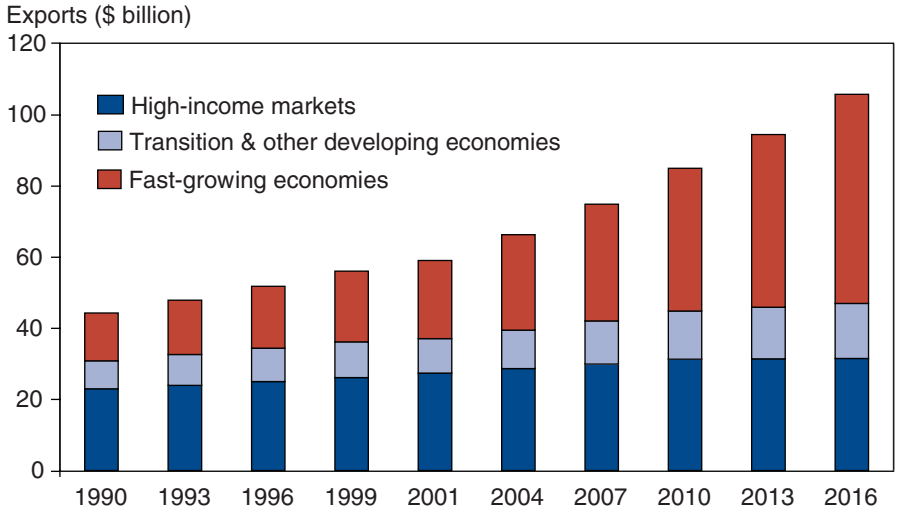
Conversely, U.S. exports to emerging markets other than Mexico and China failed to grow as much as projected. This was largely the result of devaluation of the foreign currencies affecting Southeast Asia and South Korea. As U.S. agricultural goods became more expensive for these markets, exports fell. Policy and other trade impediments also reduced export demand in other high-income markets, such as the EU and Japan, where U.S. exports were lower than the level consistent with population and economic growth changes alone. U.S. agricultural exports to "other high-income" markets (excluding Canada) would have increased by 1.1 percent annually from 1990 to 2001 due to economic growth effects, but exports actually declined 1.7 percent per year on average—an outcome attributable to policy-induced effects, such as the lack of market access in Japan, the effects of the EU's Common Agricultural Policy, and, possibly, demographic factors, such as the lower caloric needs of an aging population. These results underscore the important intervening effects of trade and domestic policies that are not explicitly considered in this model.

A second key finding is that, although future GDP and population growth are projected to slow in most countries—including the faster growing economies—more rapid growth of U.S. agricultural exports can be anticipated in the future due to the increasing share of U.S. exports flowing to countries with the highest growth rates. These effects are already apparent in recent export trends. For instance, U.S. export growth during 2001-06 averaged 5.3 percent annually, primarily due to accelerating growth in the key leading growth markets of China and Mexico. U.S. exports to these two countries surpassed the levels that were projected based on economic and population growth rates. Differences most likely stem from the effects of China's accession to the WTO in 2001 and ongoing trade liberalization with Mexico. U.S. export growth to other fast-growing emerging markets has been subdued relative to anticipated levels given the economic growth and population changes in these areas. Lack of market access in such countries as South Korea and Southeast Asia is a factor that continues to restrain U.S. agricultural exports.

GTAP model projections indicate that U.S. exports are projected to grow 3.7 percent annually during the 2006-16, compared with 2.2 percent actual growth during 1990-2001. The future growth is projected to come almost entirely from the emerging markets (fig. 6). By 2016, the rapidly growing economies are projected to account for 56 percent of U.S. exports, up from 37 percent in 2001 and 30 percent in 1990. The share of U.S. exports going to high-income markets drops from 46 percent in 2001 to a projected 29 percent in 2016.

In contrast to the general results for U.S. exports, the rapid pace of U.S. agricultural imports in recent years cannot be attributed to the effects of economic growth and population change in the United States. Actual U.S.

Figure 6
Simulated global growth influences on U.S. agricultural exports



1990-2004 are simulated using historical growth rates.
Note: High-income markets include Japan, Western Europe, Canada, and Oceania. Fast-growing economies include other East Asian countries, Southeast Asia, South Asia, Mexico, and Central America.
Source: USDA, ERS, GTAP model simulation, version 6.2 database.

import growth dwarfed the level projected by the effects of U.S. economic growth and population. This is true for both the historical 1990-2001 period and the recent 2001-06 period. U.S. imports during 1990-2001 grew 5 percent annually, compared with simulated growth of 2 percent. During 2001-06, U.S. imports rose 10.3 percent annually, similar to import levels in some of the fastest growing emerging markets and much faster than the projected level of 1.8 percent. Other forces, such as shifts in preferences for food, regional market integration of the NAFTA countries, and high rates of consumption spending by U.S. households, contributed to import growth. Supported by wealth effects and other macroeconomic conditions discussed earlier, the high per capita income level of U.S. consumers has made U.S. food and beverage imports less sensitive to price fluctuations from exchange rates. In addition, the affluent and diverse population of the United States appears to demand greater product variety than do populations of other high-income countries.[23]

[23]Recent trade statistics for U.S. food and beverage imports indicate a widening mix of country sources. For example, the United States now imports wine from more than 40 countries. The ethnic makeup of the U.S. population has broadened food preferences and increased demand for foreign-made products.